FEBRUARY, 1956

modern castings

Owned by THE MEN WHO BUY

Peale is Convention Speaker

Famed Norman Vincent Peale to headline Castings Congress annual banquet in May

It's Easy to Try Basic

Low-cost trials can be made by grading basic refractory over regular acid brick

How to Make Good Test Bars

Fast melt, degassing, careful skimming before pouring are all important factors

5 Ways to Use Zircon Sand

Zircon can cut cleaning costs; give an added chill action; mix with core sand

Reclaiming Core Knockout Sand

Pneumatic system includes screening, feeding, scrubbing, classifying units

How to Save on Taxes

Here are some practical tips on how to cut your federal tax bill—honestly!

Non-Destructive Testing

16-page special bonus section tells how to use tests as a tool to better castings, more efficient operations

future meetings and exhibits

FEBRUARY

1-2 . . Midwest Welding Conference, *Illinois Institute of Technology, Chicago. Co-sponsored by Armour Research Foundation and Chicago section, American Welding Society.*

6-9 . . Fifth Annual Industrial Ventilation Conference, *Kellogg Center, Michigan State University, East Lansing. Sponsored by the Michigan Department of Health and the MSU School of Engineering.*

9-10 . . Wisconsin Regional Foundry Conference, *Schroeder Hotel, Milwaukee. Sponsored by the AFS Wisconsin Chapter and the University of Wisconsin and the AFS Wisconsin Student Chapter.*

16-17 . . Southeastern Regional Foundry Conference,*Tutwiler Hotel, Birmingham, Ala. Sponsored by the Birmingham District and Tennessee Chapters and the University of Alabama Student Chapter of American Foundrymen's Society.*

24 . . Malleable Founders' Society, *Drake Hotel, Chicago. Western Section Meeting.*

27-Mar. 2 . . American Society for Testing Materials, *Statler Hotel, Buffalo. 1956 Committee Week.*

MARCH

2 . . Mallable Founders' Society, *Hotel Commodore, New York. Eastern Section Meeting.*

7-8 . . Foundry Educational Foundation, *Hotel Cleveland, Cleveland. College-Industry Conference.*

12-16 . . National Association of Corrosion Engineers, *Statler Hotel, New York. 12th Annual Conference & Corrosion Show.*

19-20 . . Steel Founders' Society of America, *Drake Hotel, Chicago. Annual Meeting*

19-23 . . American Society of Tool Engineers, *International Amphitheater, Chicago. Industrial Exposition and 24th Annual Convention.*

23 . . Malleable Founders' Society, *Drake Hotel, Chicago. Western Section Meeting.*

APRIL

3 . . Material Handling Institute, *Edgewater Beach Hotel, Chicago. Spring Meeting.*

12-13 . . Malleable Founders' Society, *Edgewater Beach Hotel, Chicago. Seventh Market Development Conference.*

27 . . Malleable Founders' Society, *Drake Hotel, Chicago. Western Section Meeting.*

MAY

3 . . Non-Ferrous Founders' Society, *Atlantic City, Annual Membership Meeting.*

3-9 . . American Foundrymen's Society, *Convention Hall, Atlantic City, N. J. 60th Annual Castings Congress and Show.*

8-11 . . American Welding Society, *Buffalo. Spring Meeting & Fourth Welding and Allied Industry Exposition.*

11 . . Malleable Founders' Society, *Hotel Commodore, New York. Eastern Section Meeting.*

JUNE

4-8 . . American Foundrymen's Society, *LaSalle Hotel, Chicago. Technical Committee Week.*

5-8 . . Materials Handling Institute. *Public Auditorium, Cleveland. Materials Handling Exposition.*

6 . . American Foundrymen's Society, *LaSalle Hotel, Chicago. Technical Council.*

11-12 . . Malleable Founders' Society, *The Homestead, Hot Springs, Va. General Society Meeting.*

17-22 . . American Society for Testing Materials, *Chalfonte-Haddon Hall, Atlantic City, N. J. 59th Annual Meeting.*

SEPTEMBER

1-9 . . International Foundry Congress & International Foundry Trades' Fair, *Düsseldorf, Germany.*

17-21 . . Instrument Society of America, *New York Coliseum, New York. 11th Annual Instrument-Automation Conference & Exhibit.*

24-25 . . Steel Founders' Society of America, *The Greenbrier, White Sulphur Springs, W. Va. Fall Meeting.*

OCTOBER

11-12 . . National Foundry Association, *Detroit. Annual Meeting.*

18-20 . . Foundry Equipment Manufacturers' Association, *The Greenbrier, White Sulphur Springs, W. Va. Annual Meeting.*

Apprentice Contest Entries Due

■ Patterns and castings to be entered in the American Foundrymen's Society apprentice contest must be in Chicago for judging on April 1, the society has announced. This year's competition is the thirty-third annual event that AFS has sponsored among the industry's beginners, but the first contest to be titled, Robert E. Kennedy Memorial Apprentice Contest.

Robert E. Kennedy, late secretary emeritus of AFS, started the contests in 1923.

Learners, trainees, students and apprentices now have only two months in which to make their pattern or casting for this year's competition. Patterns for the molding division and blue prints and other materials for the patternmaking divisions should be requested promptly. Contestants should allow ample time for their entries to reach AFS headquarters for the judging on April 1, 1956.

Eligible contestants include any learner or trainee in the all-around practice of the trade who has not had over five years' experience in the pattern trade, nor more than four years in the foundry industry.

It is not necessary for a contestant or his company to be affiliated with AFS. Students of trade, vocational, or high schools may enter individual chapter contests at the discretion of the chapter involved. Such entries, if successful in chapter competition, will be considered on an equal basis with all other entries.

Cash prizes totaling $875 as well as certificates of recognition will be awarded the first three place winners in each of the five divisions: wood patternmaking, metal patternmaking, iron molding, steel molding and non-ferrous molding. In addition, each of the five first place winners will receive a round trip Pullman ticket to attend the

continued on page 5

february, 1956
vol. 29, no. 2

modern castings

in this issue

Norman Vincent Peale to speak at AFS Castings Congress 20
Pneumatic Reclaimer Lengthens Life of Sand / A. D. Barczak 24
How to Save on Taxes 28
How to Make Good Test Bars / Frank J. Daniels 29
5 Ways to Use Zircon Sand /A. L. Kreuer 31
It's Easy to Try Basic / John D. Sheley 32
AFS Nominates Officers and Directors 33
Non-Destructive Testing 35

SECTION

regular departments

Modern Castings Album 4
Future Meetings & Exhibits ..... Inside Front Cover
Products & Processes 6
Pouring off the Heat 11
Let's Get Personal 15
Talk of the Industry 19
Foundry Facts 51
For the Asking 57
Foundry Trade News 65
Local Foundry News 68
AFS Chapter Meetings 78
Classified Advertising 80
Advertisers and Their Agencies 81
Obituaries ..... Inside Back Cover

FOUNDRY TECHNICAL CENTER, Golf & Wolf Roads, Des Plaines, Ill.
VAnderbilt 4-0181

WM. W. MALONEY, *General Manager*
CURTIS G. FULLER, *Managing Director*

HERBERT F. SCOBIE, *Editor*
PAUL R. FOGHT, *Assistant Editor*
A. V. CARLSON, *Technical Writer*

Associate Editors

HANS J. HEINE, *Metallurgical*
H. J. WEBER, *Safety, Hygiene, and Air Pollution Control*
J. E. FOSTER, *Engineering*
A. B. SINNETT, *Education*

J. M. ECKERT, *Advertising Manager*

Advertising Offices

Chicago—100 N. LaSalle St. CEntral 6-2184, DWIGHT EARLY, SR., *District Manager.*
Cleveland—14805 Detroit Ave., BOulevard 2-2423, WM. I. ENGLEHART, *District Manager.*
New York—6 East 39th St., MUrray Hill 5-9450, ROBERT B. WESTON, *District Manager*

MODERN CASTINGS is indexed by Engineering Index, Inc., 29 West 39th St., New York 18, N. Y. and microfilmed by University Microfilms, 313 N. First St., Ann Arbor, Mich.

Published monthly by the American Foundrymen's Society, Inc., Golf & Wolf Roads, Des Plaines, Ill. Subscription price in the U.S., Canada and Mexico $3.00 per year; elsewhere, $6.00., Single Copies 50c. May and June issues $1.00. Second-class mail privileges authorized at Pontiac, Illinois. Additional entry at Des Plaines, Ill.

AUDITED PAID CIRCULATION ABC

TIPS, TRENDS AND TECHNIQUES

Leavenworth will beckon if you become too enthusiastic about saving money on your taxes, but there is some advice on page 28 that may save your tax dollars lawfully.

■ Two thousand feet of mahogany and 500 feet of pine were used to make the 1,500-pound pattern shown on our cover. Norman Anderson, a wood patternmaker, it shown with the pattern made at Warren E. Allerton Pattern Works, Benton Harbor, Mich., for the Construction Machiney division of Clark Equipment Co.

■ American Foundrymen's Society has announced the nominees for the society's 1956 elections. Named on page 33 are candidates for president, vice-president and six posts on the board of directors.

■ Want to try melting in a basic furnace? It may be less expensive than you expect. See page 32.

■ When you turn this page you will find a new photo feature page that we are calling *"album"*.

■ Get ready to put on your thinking caps and join us at the AFS Castings Congress where we will hear Dr. Norman Vincent Peale, author of the *Power of Positive Thinking* and a distinguished minister, address the annual banquet.

■ Sand saving pneumatic reclaimation system makes old sand good as new. For complete details of one installation of this system see page 29.

■ Is tensile strength specification important in selling your castings? If it is, you will profit from reading how an expert recommends test bars be poured.

■ Texas Foundries, Bay City Electric Steel, Southington Foundry, American Brake Shoe and many other firms are in the news this month. Read *Foundry Trade News* (page 65) each month for news of your competitors and suppliers.

■ If you have a question about non-destructive testing, it's sure to have been answered in the Bonus Section—pages 35-50.

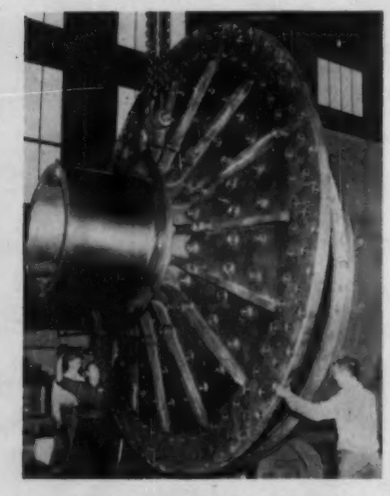
■ *For The Asking* this month you can have a 12-page book on basic refractories, a pamphlet telling about automated metallography equipment, a folder on figuring industrial truck costs and a 20-page on marketing the eastern seaboard. It's all yours *For The Asking*, page 57.

■ Coming soon. Pattern storage . . . Test for sands and molding machines . . . Role of the foreman . . . Foundry of the future . . . How to cast magnesium in plaster.

modern castings album

Burst hose idles firemen while flames consume frame buildings of Johnson & Jennings Foundry Corp. in Chicago. Once a Beardsley & Piper plant, this gray iron shop now belongs to Conlon-Moore Corp. $200,000 blaze started on roof near cupola. Another fire in Chicago did $90,000 damage at Abco Mold & White Metal Castings Co. on January 5. *UP Photo*

First die cast aluminum engine blocks come down the conveyor from the world's largest die casting machine. See story page 59.



40,000 lb head and trunion castings for 11½ ft diam grinding mill were cast from steel by Baldwin-Lima-Hamilton Corp. for Traylor Eng. & Mfg. Co. Approximately 250 holes through reinforcing bosses are for bolting on shell and service linings.

A casting goes into the acid tank in Empire Steel Castings' new pickling house in Reading, Pa. Tank will handle 4-5 tons of castings daily. A further step in a continuing cleaning room modernization program is the new blast room for sand or shot blasting of 13-14 tons of castings daily.

Feature of first meeting of the Foundry Educational Foundation's new Kentucky Industry Advisory Committee was the presentation of $2000 check to E. J. Walsh for FEF by Howard Ramsey of Archer-Daniels-Midland Company. Also pictured are University of Kentucky's E. B. Penrod, President H. L. Donovan, C. S. Crouse.

continued from page 2

1956 AFS Castings Congress in Atlantic City.

AFS members interested in nonferrous molding have requested a smaller pattern than the one used by the iron and steel divisions because of the cost of producing the entry. This request has been met and an additional pattern has been issued for use in the non-ferrous division.

Anyone interested in entering the contest should contact the education committee of the nearest AFS chapter or write: Ashley B. Sinnett, American Foundrymen's Society, Golf and Wolf Roads, Des Plaines, Ill. Canadian companies or individuals should contact G. E. Tait, Dominion Engineering Works, Ltd., Box 220, Montreal.

Companies with a number of eligible contestants may organize plant contests with the winners being entered directly in the national contest. In last year's contest 127 firms had entries.

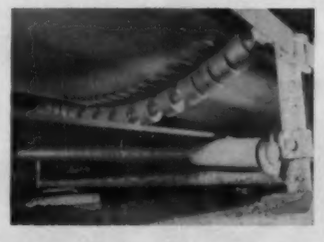
All castings and patterns made for entry in the national judging should be boxed and sent prepaid to arrive at the following address by April 1: Prof. R. W. Schroeder, General Engineering Dept., University of Illinois, Pier 47, Navy Pier, Chicago.

Milton, do you know why it cost so much extra to un-pollute the air here?

MORE FACTS on all products, literature, and services shown in the advertisements and listed in Products & Processes and in For the Asking can be obtained by using the handy Reader Service cards, pages 63-64.

products and processes

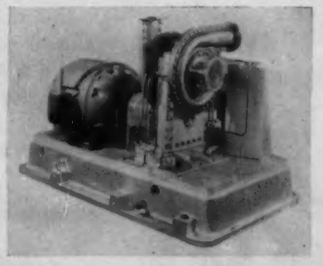
Flexible belt-idler/shapes itself to the load; uses only two bearings; resists abrasion, flame, oil, and corrosion. About 1/3 weight of 3-roll steel idler. Cushioned grip support carries



loaded belt (24", 30", and 36") without slipping, bumping, or splice damage; tends to keep belt aligned. Limberoller had 11 times life of conventional idler in foundry sand conveyor. Bulletin LD-103 **Joy Mfg. Co.**
CIRCLE No. 1, PAGE 63-64

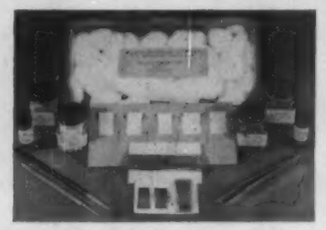
Magnetic conveyor/Magna-Mover elevates ferrous metal objects up 90° incline at 85 fpm. Requires only 18 1/2" x 37" floor space; legs fit under low pallets, is easily maneuvered; in 4', 5', and 6' lengths, others on request. **Eriez Mfg. Co.**
CIRCLE No. 2, PAGE 63-64

Low-flow centrifugal compressor/furnishes oil-free air for use in instrument systems and for processes.



Capacities range from 350 to 2000 scfm at 65 psi abs. Available also at reduced pressures. **Sawyer Bailey Corp.**
CIRCLE No. 3, PAGE 63-64

New SR-4 strain gages/of resistance, etched foil type in Do-It-Yourself kits of ten gages, four types of cement for temperatures to 1800 F, detailed instructions, and application tools.



Nichrome, Nichrome V, and Constantan grids, 0.0005" thick, 3/8", 1/2", 1" long, nominal resistance of 97-120 ohms. **Baldwin-Lima-Hamilton Corp.**
CIRCLE No. 4, PAGE 63-64

Midget chain hoist/weighing 11 lb, lifts 250 lb 7 ft at 30 fpm. Tested at 100% overload. Automatic brake. Ball bearing trolleys for standard 3" to 10" I-beams also available. **Coffing Hoist Div., Duff-Norton Co.**
CIRCLE No. 5, PAGE 63-64

Power wheelbarrow/with 3/4 ton (10 cu ft struck) capacity goes through standard doorway or aisle, fits elevators, travels any roadway up

slopes to 20%. Allows one man to do the work of four. Has quickly interchangeable flat beds. **Prime Mover Co.**
CIRCLE No. 6, PAGE 63-64

Automatic polishing attachment/for metallurgical specimens fits Buehler 8" low-speed polishers, accommo-

dates 6 mounted 1" diam specimens or 5 of 1 1/4". Average complete polishing is 20 min; requires far less skill than hand polishing. **Buehler Ltd.**

CIRCLE NO. 7, PAGE 63-64

Roof exhauster/all-welded Alumalung of aluminum weighs less than 1/3 comparable steel ventilator with-

out sacrifice of strength or rigidity. Impervious to corrosion; has low 21" silhouette. Capacities from 3800 to 42,000 cfm. **Iron Lung Ventilator Co.**

CIRCLE NO. 8, PAGE 63-64

Pneumatic wheel grinder/Series 2000 weighs 10 1/2 lb (without guard) is 8-5/8" high. Uses either straight-type abrasive wheel with guard at-

tached to the grinder body, or flanged cup abrasive wheel with revolving cup guard. **Cleco Div., Reed Roller Bit Co.**

CIRCLE NO. 9, PAGE 63-64

Portable electric acid pump/conveniently and safely transfers acids from open vessels as well as from standard carboys and drums. Centri-F pump

delivers a steady, spurt-free flow of about 6 gal/min; is self-priming, self-draining, and light-weight. **General Scientific Equipment Co.**

CIRCLE NO. 10, PAGE 63-64

Coated abrasive discs/on flexible rubber holders follow the surface, grind cleanly, without gouging. Discs self-centered and bayonet locked on Contour holders with a twist of the wrist. Don't loosen with heat. Grits: 24 to 320. 6 sizes: 3/4" to 4". **Foster Supplies Co.**

CIRCLE NO. 11, PAGE 63-64

Corrugated skid box/with four-way entrances features reinforced square corners that prevent boxes from sliding during stacking and also increase capacity. Reinforced rolled edges and lapped seams give greater strength and safety. Built to customer specs. **Palmer-Shile Co.**

CIRCLE NO. 12, PAGE 63-64

Brinell hardness tester/air-operated, semi-automatic Air-O-Brinell shows what load will be applied before test is made. Simply adjust air pressure regulator valve to desired Brinell load and make tests in rapid sequence. **Tinus Olsen Testing Machine Co.**

CIRCLE NO. 13, PAGE 63-64

Paint stick/for marking materials subject to acid, alkali, steam, cleaning solutions and temperatures to 500 F. Markal D-A in red, white, blue, green, yellow, and black. **Markal Co.**

CIRCLE NO. 14, PAGE 63-64

Air line respirators/for protection in atmospheres not immediately harmful such as fumes from molten metals, welding and cutting fumes, toxic dusts, and paint spray vapors. Bulletin describes accessories for constant flow and demand flow types and portable air line respirator equipment. **Mine Safety Appliances Co.**

CIRCLE NO. 15, PAGE 63-64

Crawler tractor/with all-hydraulic instant-shift transmission and torque converter drive has 4 speeds forward to 5.6 mph, 4 reverse to 6.2; permits smoother operation, faster work cycles, higher daily output, less danger from careless or inexperienced operators. TerraTrac "600" carries 1 cu yd loader; "500" a 3/4 yd bucket. **American Tractor Corp.**

CIRCLE NO. 16, PAGE 63-64

Electric fork truck/designed especially for high maneuverability, ease of maintenance, and increased operator comfort and convenience in 3000, 4000, and 6000-lb capacities. Low

center of gravity, increased width, and low overhand gives FT line high stability. **Baker-Raulang Co.**
CIRCLE No. 17, PAGE 63-64

Flame-resistant curtains/impregnated canvas protects from heat, and flash, molten splash, flying chips; can be made into inexpensive booths. **Eastern Equipment Co., Inc.**
CIRCLE No. 18, PAGE 63-64

Light-weight belt conveyor/of aluminum in 12', 16', 20' lengths plugs into any 115 v outlet, handles materials between floors, to and from trucks, into and out of storage. Ve-Be-Veyor weighs less than loads it carries. **A. B. Farquhar Div., Oliver Corp.**
CIRCLE No. 19, PAGE 63-64

Portable lift truck/allows operator to quickly and smoothly raise, lower or hold at any height, a load to 5000 lb on skid or platform. Electric system controls hydraulic power. Lowered height about 6 1/2", raised 44 in. **General Sales & Engineering Co.**
CIRCLE No. 20, PAGE 63-64

High temperature brazing flux/for chrome and nickel alloys is free flowing and active from 1400 to 2000 F. **Air Reduction Co., Inc.**
CIRCLE No. 21, PAGE 63-64

Air line valve coupling/New, locking, safety-type, detachable Quick-As-Wink permits operator to shut off air and change tools quickly and safely without shutting off air to the line. Valve halves interconnect among 1/4", 3/8", 1/2", and 3/4" sizes. For pressures to 250 psi. Bulletin. **C. B. Hunt & Son, Inc.**
CIRCLE No. 22, PAGE 63-64

4-way, drill point gage/enables anyone to precisely measure chisel point, point angle, and clearance angle in seconds. Takes guesswork out of sharpening, reduces breakage, permits quick drill selection for various materials. **Swanson Mfg. Co.**
CIRCLE No. 23, PAGE 63-64

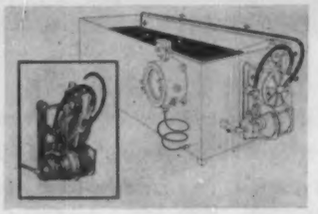
Packaged "moly"/in convenient burlap bags or can containers is now palletized for ease of handling. Pallets are expendable. Pamphlet. **Molybdenum Corp. of America.**
CIRCLE No. 24, PAGE 63-64

Featherweight goggles/weigh an ounce. One-piece, hard-surface acetate lense resists abrasion, sparks, flying chips, and spatter. May be worn over prescription glasses. Available in

CIRCLE No. 103, PAGE 63-64

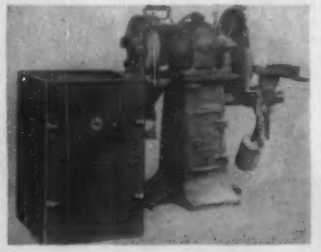
clear or medium green. **General Scientific Equipment Co.**
CIRCLE No. 25, PAGE 63-64

Viscosity control/maintains dip tank paint temperature within ± 1° in



the range of 70 to 100 F. Models for 200 or 600 gal tanks. Booklet. **Spee-Flo Co.**
CIRCLE No. 26, PAGE 63-64

Dust collector/Model 64 can be used with double-end pedestal grinders with wheels to 10", single spindle disc grinders or sanders to 18" diam, tool and cutter grinders, polishing and buffing wheels, surface grinders



and lathes. With 4" inlet, unit moves 500 cfm air at 5700 fpm at 4" static pressure (water). **Torit Mfg. Co.**
CIRCLE No. 27, PAGE 63-64

Crane attachment/for handling palletized materials can be used under monorails or bridge cranes as a substitute for or a supplement to lift

trucks. Capacities from one ton up. Models without counterbalances or with adjustable forks also available. **Cady Metal Fabricating Co.**
CIRCLE No. 28, PAGE 63-64

pouring off the heat

not a secret

■ All of us at National Malleable & Steel Castings Co. were surprised to see the article on *"Chain Casting Secrets"* in the October issue of MODERN CASTINGS. The inference was that this is a new process peculiar to Electric Steel Foundry Co.

You may be interested in the fact that National Malleable cast the first chain in December of 1917 and an article was published in the July 4, 1918, issue of *Iron Age* describing the process. The process was further publicized by a paper given at the ASTM annual meeting in June 1918.

National Malleable was granted patents on the process in 1921 and we have produced chain by this process for many years. In fact, during the last war we produced as much as 1000 tons of chain per week.

B. C. YEARLEY, *Eng. Asst. to Vice-President*
National Malleable & Steel Castings Co.
Cleveland

The head for the article was not meant to imply that the process was peculiar to Electric Steel Foundry Co. It was merely our headline writer's way of getting foundrymen to read an interesting story about a process few of them have the opportunity to see.—Editor.

for a semi-elastic carbon mold

■ We have noted your comment on our carbon mold material in your Talk of the Industry page. It appears that your source was somewhat inaccurate and misleading, and we'd like to take the opportunity to set the record straight.

Actually there are two materials. One is a carbon-base mold compound which is handled in conventional foundry equipment. It can be hand rammed or used in normal mold machinery, and requires baking temperatures of about 400 F. The finished mold is semi-elastic and has a high heat conductivity. Porosity can be made to range from the lower sand ranges to almost zero. While we have obtained as many as 40 to 50 pours in a single mold, we feel that 10-12 is a more realistic figure.

Our second material is a carbon powder that can be cold formed into

fairly complex shapes. It requires a high temperature bake (1800 F) and is useful as a mold in hot pressing of powdered metals and similar materials.

Rand Development Corp. is primarily a research organization, and we are not in production on either of these materials. Rather we are interested in finding a partner to handle the commercial development and production end. We are, however, in a position to supply test samples of either type of carbon mold to qualified possible users.

S. B. TWITCHELL, JR.
Rand Development Corp.
Cleveland

Compare Pearlitic Irons

Comparison of the mechanical properties of pearlitic malleable iron when it is air quenched and drawn and when it is reheated, liquid quenched, and drawn will be made at the 1956 AFS Castings Congress.

A report of the Pearlitic Malleable Committee 6-E of the American Foundrymen's Society Malleable Division will contain a brief history of the iron, melting and annealing practices, and base composition of three prominent duplex shops. Both heat treatments will be detailed. Physical properties of metal from each will be analyzed and reasons given for differences.

In view of wide-spread interest in pearlitic malleable, the committee has scheduled as objectives:

1. Sponsorship of papers and shop courses for the annual AFS convention and for publication.
2. Research on machinability of pearlitic vs spheroidized structures in terms of tool wear, friction, and horsepower; wear resistance of pearlitic at different hardnesses; hardenability of pearlitic; specific purpose alloying; impact test and test bar; fundamental relationships of Bhn, YS, TS, and percent elongation as functions of tempering temperature and time and microstructure—similar to SAE graphs for hardened and tempered steels.
3. Correlation of all AFS activities pertaining to pearlitic malleable iron.

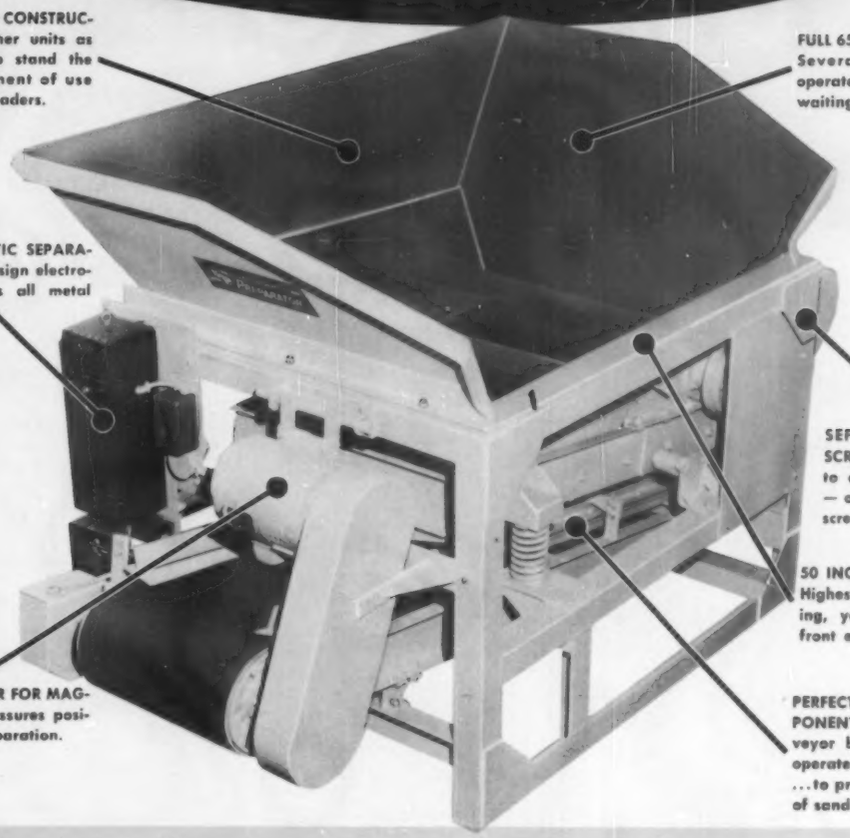
the new "80" Preparator

• RUGGED NEW UNIT FULLY CONDITIONS 78 TONS PER HOUR...REQUIRES NO PITS

REALLY RUGGED CONSTRUCTION — No other units as rugged. Built to stand the severe punishment of use with front end loaders.

BETTER MAGNETIC SEPARATION — New design electro-magnet removes all metal scrap.

SEPARATE MOTOR FOR MAGNETIC PULLEY—Assures positive magnetic separation.



FULL 65 CUBIC FOOT HOPPER Several front end loaders operate efficiently without waiting periods.

SEPARATE MOTOR FOR SCREEN — Motor selected to do one job perfectly — operates the vibratory screen at proper speed.

50 INCH LOADING HEIGHT Highest capacity conditioning, yet usable with any front end loader.

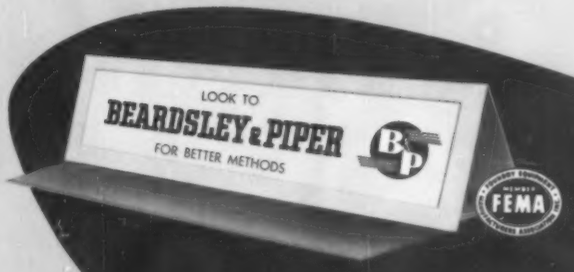
PERFECTLY "MATED" COMPONENTS — Screen and conveyor belt are designed to operate efficiently together ...to provide smoothest flow of sand.

Now, highest capacity and above floor construction have been combined in the new B & P "80" Preparator. Up to 78 tons of sand may be thoroughly conditioned each hour, yet overall dimensions and space requirements are lower than for machines of far less capacity.

The new "80" is available for both independent use and for use with Speedmullor-Preparator units. A loading height of only 50 inches makes it usable with any front end loader. The large hopper capacity of 65 cubic feet facilitates fast loading with no waits while the hopper empties.

No other conditioning unit available will thoroughly screen and magnetically separate as high a capacity of sand as the new "80" Preparator.

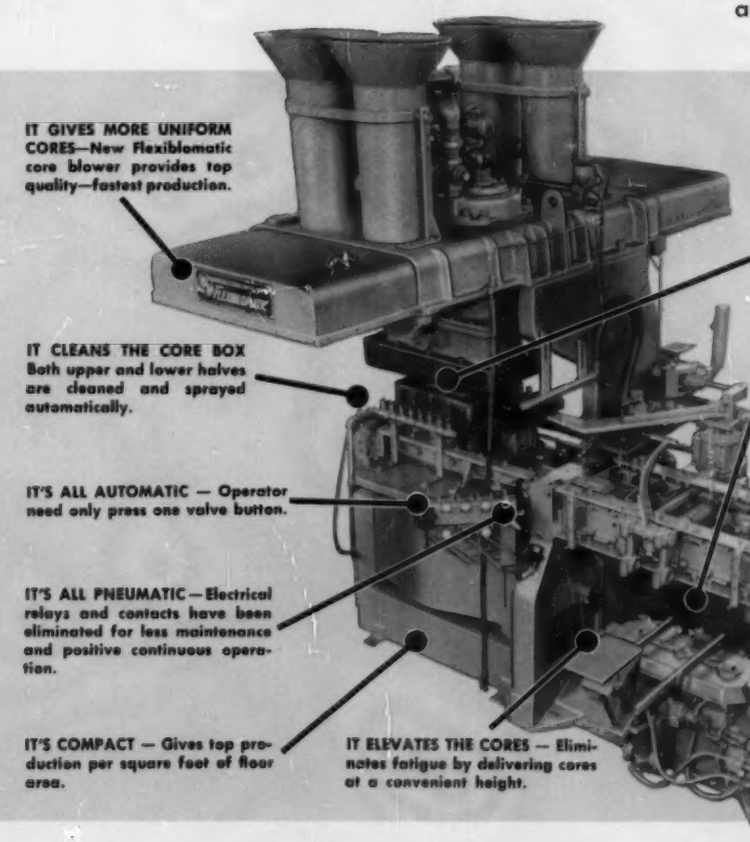
Write now for details: Beardsley & Piper, Division Pettibone Mulliken Corporation, 2424 North Cicero Avenue, Chicago 39, Illinois.



A ONE MAN CORE DEPARTMENT

New TR Cormatic Unit produces 240 cores per hour

The new B & P Cormatic unit is all pneumatic and all automatic. Troublesome electrical contacts and relays have been eliminated, assuring less maintenance and continuous trouble-free operation. This new unit blows, rolls over, and draws up to 240 cores per hour. Cores up to 24 x 36 inches in size are handled. Indexing of the box, blowing, rollover and drawing, ejection, delivery of the core and cleaning of the box are all automatic.



IT GIVES MORE UNIFORM CORES—New Flexiblomatic core blower provides top quality—fastest production.

IT HANDLES TWO BOXES — Two different boxes may be run simultaneously.

IT CLEANS THE CORE BOX Both upper and lower halves are cleaned and sprayed automatically.

IT ROLLS OVER FASTER — The great speed that only a trunnion type rollover can provide.

IT'S ALL AUTOMATIC — Operator need only press one valve button.

IT'S ALL PNEUMATIC—Electrical relays and contacts have been eliminated for less maintenance and positive continuous operation.

IT DRAWS MORE ACCURATELY TR Rol-A-Cor is a precision machine designed for top accuracy.

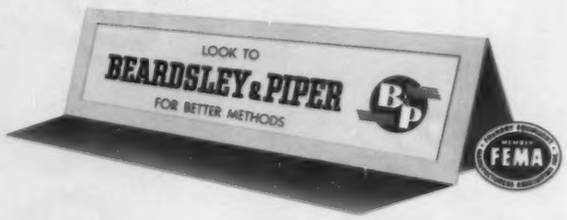
IT'S COMPACT — Gives top production per square foot of floor area.

IT ELEVATES THE CORES — Eliminates fatigue by delivering cores at a convenient height.

IT'S RUGGED—Cast steel frame — heavy rugged construction throughout.

Incorporating a new B&P Flexiblomatic core blower and the new trunnion Rol-A-Cor rollover and draw machine, the TR Cormatic Unit presents a new concept in core production. It handles the entire production cycle, yet requires only one man for its operation. The unit does the work, the operator need only actuate one valve, place the core plate, and remove the finished core. So easy is the operator's job that one man is able to operate two or three of these units. Any type of core box for cores weighing up to sixty pounds may be handled. Look at the features shown above and you'll see why the B&P TR Cormatic is a one man core department.

Write for details today: Beardsley & Piper, Division Pettibone Mulliken Corporation, 2424 North Cicero Avenue, Chicago 39, Illinois.



let's get personal

Peter D. Humont . . moved from Eastern Clay Products Dept., International Minerals & Chemical Corp., to become sand supervisor for Texas Foundries, Inc.

Blaw-Knox Co., Pittsburgh, has made interim appointments of officers to operate their recently acquired Contintental Foundry & Machine facilities. **M. G. Sternberg** has been named vice-president in charge of the operation with **B. P. Hammond** as vice-president in charge of eastern casting sales and **H. A. Forsberg** vice-president in charge of western casting sales.

N. Harold Boardman . . now manager-manufacturing and employee and plant community relations at Elmira, N. Y., plant of General Electric's foundry department.

Charles G. Lauckner, III . . moves from offices of General Electric's foundry department in Schenectady to new post of manager-manufacturing engineering at Elmira, N. Y., plant. **E. Raymond Filosi** replaces Lauckner as department's facilities engineer.

Beauford E. Gavin . . moved up to manager of National Mallable and Steel Casting Co. Indianapolis plant when **W. W. Flagle** retired on January 1. Gavin, former assistant manager, has been with National since 1930. Flagle had been with the firm since 1918.

Richard C. Bannon . . has been made vice-president in charge of sales for Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.

Michael Gladstone . . appointed sales manager of Alloy Precision Castings Co., Cleveland. He was formerly president of Centrifi-Cast Co.

George W. Baillie, Sr. . . . vice-president of Quaker City Foundry, Inc., Salem, Ohio, named president of Industrial Information Institute.

Edmund M. Wise . . named assistant to vice-president-manager of the development and research division of International Nickel Co.

George P. Holman . . promoted to senior process development engineer in General Electric Company's manufacturing services.

Ben Kaufman . . promoted to general manager of Ajax Metal Div., H. Kramer & Co., Philadelphia.

Harold Lind . . midwestern sales representative for Beardsley & Piper division of Pettibone Mulliken Corp. has retired after 31 years with the company. **Harold C. Weimer,** chief

W. W. Flagle

B. E. Gavin

H. C. Weimer

layout engineer for B & P, will succeed Lind as sales representative in the midwest.

Theodore A. Rapp . . has been appointed industrial sales manager of R. Hoe & Co., Inc., machinery manufacturer now seeking jobbing work for its foundry.

Donald G. Sturges . . former director of operations of the AEC Hanford plant has been appointed manager of the new products branch of the research and development division of Carborundum Co.

Henry Bryk . . now superintendent of Thermit Metal department of Metal & Thermit Corp. Bryk was formerly plant manager for Arwood Precision Casting Co.

Robert Bressler . . named manager of industrial relations for Doehler-Jarvis division of National Lead Co.

W. G. Frank . . elected president of American Air Filter Co.

Richard C. Newbold . . former president of Lehigh Navigational Coal Sales Co., has joined George F. Pettinos, Inc., producers of industrial sands and supplies, as vice-president in charge of sales.

Kay Miller . . former chief research and development engineer of Borg Warner Corp. has been appointed assistant chief engineer of American Tractor Corp., Churubusco, Ind.

Harry E. Connors . . named general manager of railroad sales for National Bearing division of American Brake Shoe Co.

D. C. Bradley . . named general manager of pulverizing machinery division of Metals Disintegrating Co., Summit, N. J.

Norton Co., Worcester, Mass., has appointed four sales managers: **D. L. Price** will head grinding wheel sales; **G. A. Park,** abrasive sales; **H. T. Pierpont,** refractory sales; and **F. L. Curtis,** new product sales.

Stephen J. Pentrack . . promoted to purchasing agent for materials manufacturing department, Westinghouse Electric Corp., Pittsburgh.

Herbert H. Lett . . appointed technical editor of the public relations branch of Carborundum Co., Niagara Falls, N. Y.

Kenneth MacKay Smith . . foundry consultant specializing in technical problems and statistical quality control has opened an office at 541 Ridge Road, Wilmette, Ill.

Morton B. Gilbert . . joined Chicago district staff of F. J. Stokes Machine Co. as sales engineer.

A. Lindsay Cooper . . named superintendent of Delavaud pipe shop, Toronto operation of National Iron Div., Canada Iron Foundries, Ltd. Cooper succeeds **James B. Compson,** pioneer in centrifugal casting, who has retired.

F. W. Neville . . named purchasing manager of C. O. Bartlett & Snow

F. W. Neville

Co., Cleveland. Neville has been production manager of firm since 1952.

Hubert C. Smith . . elected vice-president in charge of operations of the eastern division of Colorado Fuel & Iron Corp.

Marshall A. Larson . . named Des Moines area representative of Nutting Truck & Caster Co., Fairbault, Minn.

John L. Kimberley . . former secretary of American Zinc Institute was appointed executive vice-president after retirement of Ernest V. Gent.

Dr. Wingate A. Lambertson . . named assistant to manager, research branch of the research and development division of Carborundum Co.

A. J. Van Harn . . resigned as vice-president of Grindle Corp. to join Fruehauf Trailer Co., Detroit.

Charles M. Dick, Jr. . . will head sales of Kel-Ray projectors for industrial radiography. Projectors are sold by Metal & Thermit Corp.

J. K. Hutchens . . is now on sales staff of Superior Steel and Malleable Castings Co., Benton Harbor, Mich.

A. L. Cooper

J. B. Compson

J. K. Hutchens

Alan R. Moore . . has joined engineering staff of product development

A. R. Moore

lab at Superior Steel & Mallable Castings Co., Benton Harbor, Mich.

Leslie E. Simon . . retired U. S. Army assistant chief of ordnance named director of research and development division of Carborundum Co.

B. W. Duncan

Beverly W. Duncan . . now head of research and development for Misco Precision Casting Co., Whitehall, Mich.

A. P. Guidi

Arthur P. Guidi . . has joined Texas Foundries, Inc., Lufkin, Texas, as assistant to plant manager.

Norton Co. has promoted three men to managerial sales posts. They are: **Robert Chushman,** assistant to sales manager, grinding wheels; **Harry G. Brustlin,** west coast district manager;

and Donald F. Jones, Pittsburgh district manager.

E. G. Swigert

Ernest G. Swigert . . president of Hyster Co. has been elected national vice-president of National Association of Manufacturers.

George R. Galbraith . . now assistant vice-president of the Walworth Co.

P. R. Hennum

Paul R. Hennum . . joined Superior Steel & Malleable Castings Co., Benton Harbor, as personnel manager.

Walter A. St. Clair . . promoted to assistant sales manager of Hyster Co.'s eastern industrial truck division.

R. G. Whitehead

R. Grant Whitehead . . named sales manager of Claude B. Schneible Co.

Paul O. Leaf . . will headquarter in Moline, Ill., as Iowa and western Illinois rep for Illinois Clay Products Co.

talk of the industry

BOAT COAT of glass cloth and plastic resin strengthened hulls of small craft, resisted dragging over stony beaches, so why wouldn't it do the same for old patterns, a Sunday sailor wondered. He tried it . . . it worked . . . now several Chicago job shops are successfully salvaging long unused patterns when the customer needs a replacement casting. Kit containing glass cloth, resin, primer, simple directions will soon be available.

SECOND MALLEABLE HEAT LATE? Can't get your afternoon air furnace heat out without overtime? First metal misrun because you tap cold trying to rush the heat? Try this, says Cy Semrau, Hill & Griffith Co., speaking from his many years of malleable melting experience. Hold back 10,000 to 15,000 lb. molten metal from the first heat, enough to insure against setting up when the balance of the charge is added. Charge scrap and cleaned sprue at burner end. Put pig iron toward the rear where it melts readily and helps melt the scrap and sprue. Cleaned sprue melts faster than sandy sprue and forms little slag so temperature pickup is good from the start. Warning! Materials to be charged in the afternoon heat should be stored indoors for at least 24 hours to insure against dampness which can cause undesirable fireworks!

TEAR-DOWN METHOD they call it in General Electric's Hotpoint Div. Two or three employees pick a product or method of operation for discussion. First man assumes position that everything is wrong with product or operation and offers another solution. Next man attacks this stand and offers an alternative solution. And so on. One result: a $200,000 conveyor system plan was attacked by "tear down" and $4000 substitute was developed and installed.

BRASS AND BRONZE FOUNDRYMEN who think there is a marked difference in types of copper-base alloys used in peace and war are right. In times of peace larger quantities of yellow brasses are produced. In war-time the red alloys, with higher physicals, are in greater demand according to the Autumn 1955 Copper Industry Report of BDSA. Consumption of copper raw materials by B & B foundries in the third quarter decreased approximately 10% from the second quarter, reflecting the usual summer seasonal decline, the report states. Copper and copper-base alloy scrap decreased only 1-1/2 million lb from the previous quarter, as against a reduction of 20 million lb in the use of composition ingot.

Herbert E. Scobie

Castings Congress & Show

- **Norman Vincent Peale to speak**
- **Exhibit almost sold out**
- **Program highlights listed**

■ Dr. Norman Vincent Peale, author of *The Power of Positive Thinking*, and minister of Marble Collegiate Church, New York, will address the annual banquet of the 1956 AFS Castings Congress.

In announcing this, Wm. W. Maloney, AFS general manager, points out that the banquet will be held the evening of Friday May 4 instead of Saturday May 5 as published in the tentative schedule (MODERN CASTINGS, January, page 26).

Meanwhile the unprecedented demand for larger than usual space by many exhibitors has required removal of two wall areas in the huge Atlantic City Convention Hall in order to add 3400 sq ft. of additional display space. By the middle of November according to Wm. N. Davis, exhibit manager, applications had been received at the AFS Technical Center for more space than was then available. He attributes this to the increased number of operating exhibits planned. To be shown for the time will be CO_2 hardening of molds and cores. More than a dozen operating displays of shell molding will be on view along with numerous other exhibits covering the entire field of foundry materials, methods, and machines. Space assignments started December 1 and most space is now under contract.

Concurrently with the week-long exhibit of foundry tools and services a series of technical sessions, shop course meetings, and round table luncheons will be staged under sponsorship of the more than 100 committees that conduct AFS technical activities. Over 50 sessions, most of them featuring two technical papers, will be held during Castings Congress Week. All daytime sessions except the authors breakfasts and round table luncheons will be held in the Atlantic City Convention Hall. Breakfasts, luncheons, and all evening sessions will be held in nearby hotels.

Scheduling of technical activities has followed the practice established over the years of grouping meetings by industry interest in so far as possible. This enables foundrymen to take in the maximum number of meetings in the shortest possible time, thus leaving ample time for viewing exhibits. Summarized, the program shows:

Gray Iron. Thursday May 3 through Tuesday May 8, four technical sessions, two shop course meetings, one round table luncheon.

Malleable. Thursday May 3 through Saturday May 5, two technical sessions, one shop meeting, one round table luncheon.

Sand. Thursday May 3 through Wednesday May 9, five technical sessions, two shop course meetings, one round table luncheon.

Brass & Bronze. Thursday May 3 through Saturday May 5, three technical sessions (one a defective casting clinic), one round table luncheon.

Pattern. Friday May 4 through Tuesday May 8, two technical sessions, one round table luncheon.

Education. Friday May 4 through Monday May 7, two technical sessions, one round table luncheon.

Light Metals. Friday May 4 through Tuesday May 8, four technical sessions, one round table luncheon.

Plant & Plant Equipment. Friday May 4 through Wednesday May 9, three technical sessions.

Industrial Engineering-Costs. Saturday May 5 through Tuesday May 8, two technical sessions, one round table luncheon.

Refractories. Saturday May 5, one technical session.

Heat Transfer. Monday May 7 and Tuesday May 8, two technical sessions.

Steel. Monday May 7 through Wednesday May 9, three technical sessions, one round table luncheon.

Safety, Hygiene, & Air Pollution Control. Tuesday May 8 and Wednesday May 9, two technical sessions, one round table luncheon, and a management dinner.

At the annual banquet the following named by the Board of Awards will be honored with AFS gold medals and honorary life memberships:

Prof. Charles C. Sigerfoos, professor of metallurgical engineering, Michigan State University—the Thomas W. Pangborn Gold Medal "for outstanding contributions to the Society and the Castings Industry, particularly in the field of education of engineering students for foundry careers."

James S. Vanick, foundry engineer, International Nickel Co.—the William H. McFadden Gold Medal "for outstanding contributions to the Society and for valuable service to the ferrous castings industry over a period of many years."

Harold F. Bishop, metallurgist in charge of foundry research, U. S. Naval Research Laboratory—the Joseph S. Seaman Gold Medal "for outstanding contributions in the field of castings research at the Naval Research Laboratories and for contributions to the Society."

Joseph C. Pendleton, retired superintendent, foundry division, Newport News Shipbuilding & Dry Dock Co. —Honorary Life Membership "for outstanding contributions to the advancement of the arts and sciences of metal castings, particularly in the field of naval architecture requirements."

William D. McMillan, supervisor of metallurgy, McCormick Works, International Harvester Co.—Honorary Life Membership "for outstanding contributions to the Society and the ferrous castings industry."

Bruce L. Simpson, president, Na-

Dr. Norman Vincent Peale . . . principal speaker at AFS annual banquet.

tional Engineering Co.—Honorary Life Membership "on completion of his present term of office as president of the American Foundrymen's Society."

For quick reference many of the highlights of the 1956 AFS Castings Congress have been summarized below:

What, Where, When. The 60th Annual AFS Castings Congress & Show will be held in Convention Hall, Atlantic City, N. J., May 3-9.

Advance Registration. You can register for this year's Castings Congress in advance by using the adjacent convenient form. Personal registration badge will be sent promptly from the AFS Technical Center so you'll be all set to walk right in without delay. Advance registration offer applies only up to April 23.

All exhibitor representatives *who will be manning exhibit booths* will be registered gratis through blanket registration made by exhibiting companies.

1956 Castings Congress paper authors and speakers and bona fide students are not required to pay a registration fee.

Daily Attendance List printed each day will show name of individual, company, and hotel. Hotel assignment made by AFS Housing Bureau will not appear on list unless indicated on registration card.

Hotel Application. Congress housing is being handled by the AFS Housing Bureau in Atlantic City. Application form, list of hotels and prices, and map showing location appeared on pages 28-29 of the January issue of Modern Castings. Room assignments began February 1.

Exhibit Hours. Exhibit hall will be open from 9:00 am to 5:30 pm on May 3, 4, 7, 8, and 9. Exhibits will not be open on Sunday May 6 nor on any evening. Exhibit hours Saturday May 5 are 9:00 to 12:00 noon and 2:00 to 5:30 pm.

Annual Business Meeting. Election of officers (nominees on page 33) and presentation of Robert E. Kennedy Apprentice Contest awards (page 2) will occur at a luncheon meeting Saturday noon May 5. This replaces the morning or afternoon business session of former years.

Hoyt Memorial Lecture. The annual Charles Edgar Hoyt Memorial Lecture, by S. C. Massari, former AFS technical director, will be presented in conjunction with the annual business meeting luncheon. Exhibits will be closed for the luncheon, business meeting, and lecture.

Annual Banquet. Re-scheduled to be held the evening of Friday May 4 instead of Saturday May 5. Features presentation of AFS gold med-

AFS CASTINGS CONGRESS & SHOW
ATLANTIC CITY MAY 3-9, 1956
ADVANCE REGISTRATION CARD

● TYPE OR PRINT CLEARLY

NAME_____

POSITION_____

COMPANY_____

*CO. STREET ADDRESS_____

*CITY_____ ZONE____ STATE_____

***NOTE: Show Address and City WHERE YOUR OWN PLANT or OFFICE is located.**

HOTEL TO WHICH ASSIGNED_____

PLEASE FILL IN COMPLETELY

TURN OVER

IMPORTANT

Type or print in reverse side completely. To receive Official Badge **in advance** of Congress, return card **NOW** with Registration Fee.

MAIL Direct To: **AMERICAN FOUNDRYMEN'S SOCIETY**
Golf & Wolf Roads
Des Plaines, Illinois

REGISTRATION FEES: Indicate ☐ AFS Member, $2.00 ☐ Non-Member, $5.00

YOUR PERSONAL CONVENTION REGISTRATION BADGE WILL BE SENT PROMPTLY TO YOUR ATTENTION.

Exhibitor representatives who will be manning exhibit booths will be registered gratis through blanket registration made by exhibiting companies.

Register In Advance

Wear Your Badge . . . Walk Right In

Foundrymen . . . AFS members . . . non-members . . . guests . . . secure your official badges in advance of the 1956 AFS Castings Congress & Show, Atlantic City, May 3-9. Avoid filling out cards or waiting in line for badge to be typed. Be free to greet your friends, see the exhibits, and attend the meeting of your choice without inconvenience or delay.

It's simple. Fill in completely one of the cards above. Mail it to American Foundrymen's Society, Golf & Wolf Roads, Des Plaines, Ill., together with member registration fee of $2.00 or non-member fee of $5.00. Congress badge for your personal use (needed for admission to all sessions except Shop Courses) will be sent promptly.

Pass on the other Advance Registration Card to a friend who may be planning to attend this year's AFS Castings Congress & Show.

IAL ISSUES
and Advertisers

M ISSUE

industry-wide distribution *before* show.

gram of technical sessions, exhibit nts.

king to alert the audience to products played in the Show.

Y ISSUE

the Congress period, with *bonus*

Y of the products exhibited in "The by subject classifications and keyed ll for location.

f Tomorrow"—designed to project today's market with tomorrow's

RT ISSUE

rable link to sales consideration urchase of foundry equipment and

velopments for 17,000 foundry buy- STINGS for factual writeups and e permanent history of the 60th

expansion programs resulting from npressions created by "The Foundry

advertiser-exhibitors will of their sales or service lising help for display in

l.

of Tomorrow" through represen-

rve_____ page(s).

☐ June

_____

_____

te_____

e_____

IMPORTANT

Type or print in reverse side completely. To receive Official Badge **in advance** of Congress, return card **NOW** with Registration Fee.

MAIL Direct To: AMERICAN FOUNDRYMEN'S SOCIETY
Golf & Wolf Roads
Des Plaines, Illinois

REGISTRATION FEES: Indicate ☐ AFS Member, $2.00 ☐ Non-Member, $5.00

YOUR PERSONAL CONVENTION REGISTRATION BADGE WILL BE SENT PROMPTLY TO YOUR ATTENTION.

AFS CASTINGS CONGRESS & SHOW
ATLANTIC CITY MAY 3-9, 1956
ADVANCE REGISTRATION CARD

● TYPE OR PRINT CLEARLY

NAME_____

POSITION_____

COMPANY_____

*CO. STREET ADDRESS_____

*CITY_____ ZONE____ STATE_____

***NOTE: Show Address and City WHERE YOUR OWN PLANT or OFFICE is located.**

HOTEL TO WHICH ASSIGNED_____

PLEASE FILL IN COMPLETELY

TURN OVER

Exhibitor representatives who will be manning exhibit booths will be registered gratis through blanket registration made by exhibiting companies.

Register today. Advance registration offer applies only to registrations received prior to April 23.

Hotel to which you are assigned (hotel application blank appeared in the January issue of MODERN CASTINGS) should be listed if you have this information at the time you apply for advance registration. Hotel name enables friends to locate you at the Congress. If your hotel has not been assigned, send in your advance registration anyway. Your hotel can be added to your card at the Congress by merely requesting one of the clerks at the AFS Registration Desk in the Atlantic City Convention Hall to do so.

If you prefer to register at the Congress, fill in one of the Advance Registration Cards and bring it with you to Atlantic City. Won't save as much time but it's faster than starting from scratch after you arrive.

Register In Advance

Wear Your Badge . . . Walk Right In

als and honorary life memberships. Principle speaker: Dr. Norman Vincent Peale.

Preprints of Congress Papers. As in the past a number of papers to be presented in Atlantic City will be available prior to presentation. A list of preprints and a convenient post card request form will appear in the March issue of MODERN CASTINGS. This should be filled in and mailed promptly to guarantee receipt in time for preparation of written and oral discussion.

Ladies Program. Social events for the ladies, in addition to the annual banquet, the traditional AFS Tea, and other regular convention functions, will include luncheons, special ladies activities, and a "strip tease" style show.

Old Timers Registration. As in the past, old timers of 25 years and longer service to the castings industry will register at the AFS Technical Center booth to receive their service pins.

Canadian Registration book will be open again in the AFS booth as a convenience to Congress attendants from the provinces who want to see who's there from Canada.

International Registration book will also be located in the AFS booth as a convenience to overseas visitors who want to contact friends.

None of the special registration books takes the place of official Congress registration which is required of all attending the Show and technical sessions.

AFS Alumni Dinner. "Official Family" of AFS—present and past officers, directors, medalists, honorary life members—will meet the evening of Monday May 7 at a reception and dinner.

Past President's Luncheon. In former years a breakfast meeting, this traditional gathering of past national presidents of the American Foundrymen's Society has been set for Sunday noon May 6.

Non-Ferrous Founders' Society. Annual meeting of the trade organzation of non-ferrous foundrymen will be held all day Thursday May 3. NFFS Membership Dinner is scheduled for the evening of the same day.

Manpower. Personnel, skill requirements, and training for workers in mechanized foundries—subject of current nationwide survey by the U. S. Bureau of Apprenticeship—will be discussed at the Education Round Table Luncheon Friday May 4. Survey findings will be presented.

Noise. Legal aspects of industrial noise will be presented at a luncheon Tuesday noon May 8. At a technical

session immediately thereafter there will be a demonstration of industrial noise propagation and reduction by a number of noise barriers of varying effectiveness.

Management Dinner will be highlighted by a presentation on air pollution as a comunity relations problem. Difficulties arise, it will be shown, not primarily because of air pollution but because of a community's lack of understanding of industry's problems.

5 Senses Exhibit will show how management can solve many of its own problems in the fields of safety, hygiene, and air polution by using man's five senses—sight, hearing, taste, touch, smell. Exhibit will be manned by authorities making up the committees of the AFS Safety, Hygiene, & Air Pollution Control Program.

Research sponsored by AFS and its practical value to the castings industry will be portrayed in an exhibit set up by the Technical Department of the Society. Work in the fields of gating, risering, mold surface effects, elevated temperature properties of molding sands, and many others will be shown along with some of the test facilities. Recommended practices in both horizontal and vertical gating systems will be shown by color-sound movie.

Atlantic Coast Day, Saturday May 5, is a "free" day. No registration fee will be charged on this day as a courtesy to foundrymen of the area able to attend exhibits and technical sessions only on Atlantic Coast Day.

Casting Defect Clinic. Scheduled for the afternoon of Saturday May 5 is a defective casting clinic under the sponsorship of the Brass & Bronze Division.

Sand Division Dinner. New developments in the CO_2 process and core "blowing" will be discussed in detail at the dinner sponsored by the Sand Division the evening of Saturday May 5.

Shop Courses. This year as in many years past a number of informal discussions of shop problems will be held. While intended primarily for the operating man they are open to all. On schedule are: Gray Iron—evening, May 3, and afternoon, May 4; Malleable—afternoon, May 5; Sand—evening, May 7 and 8.

Authors Breakfasts. Breakfast meetings of speakers and session chairmen, instituted at the 1955 AFS Convention, will be repeated again this year. First gathering will be a luncheon Thursday May 3 because technical sessions do not start until 2:30 pm that day.

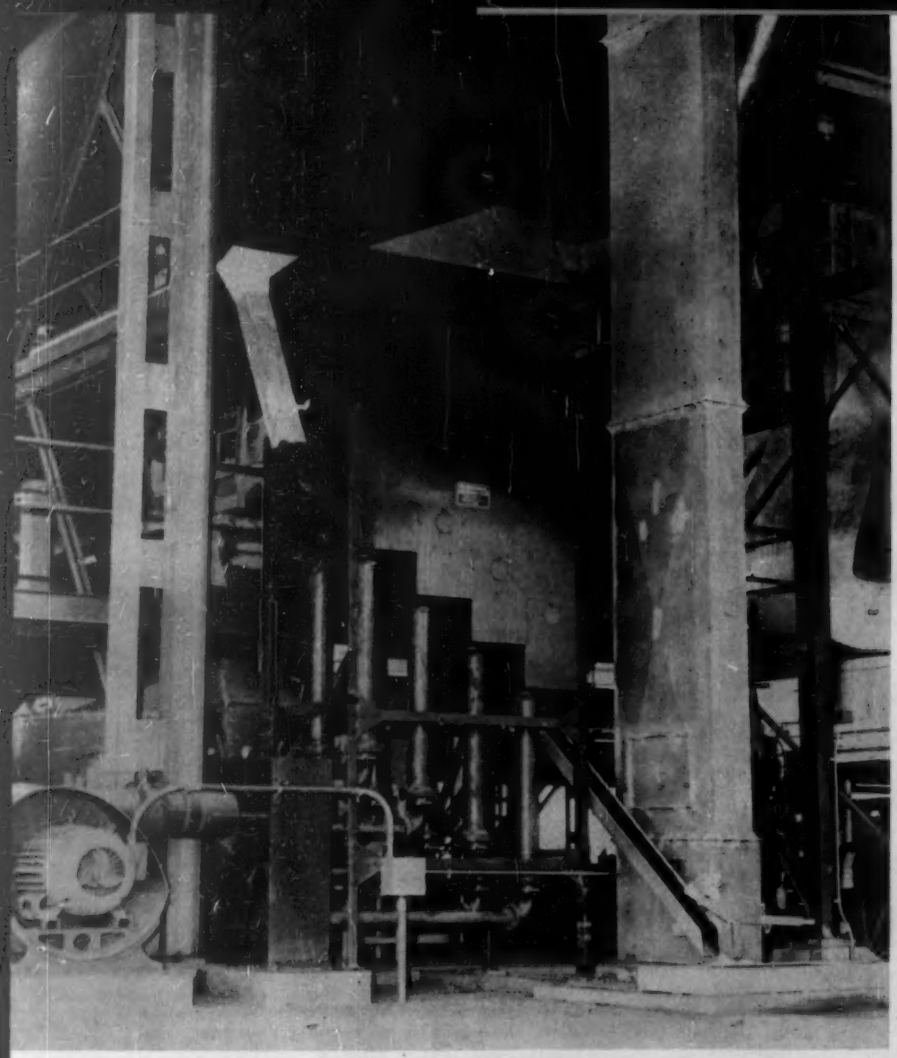
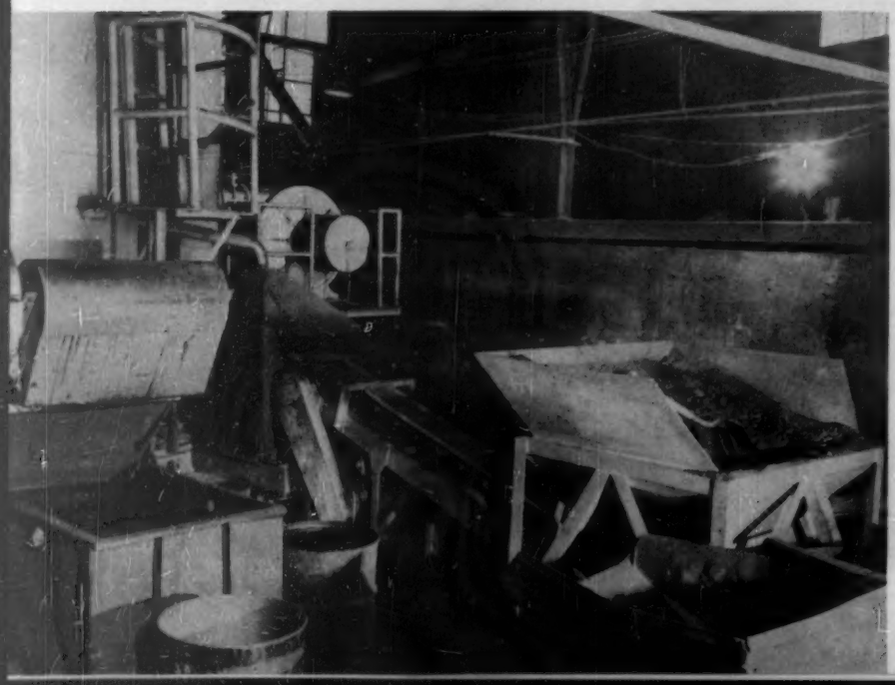
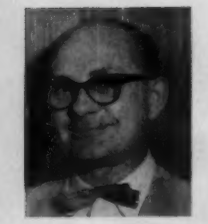


Fig. 1 . . Step-like battery of scrubber cells where sand is subdivided.

Fig. 2 . . Variable speed belt controls reclamation rate from 1-4 ton/hr.



Pneumatic



ALEXANDER D. BARCZAK / *Plant Manager*
Superior Foundry, Inc., Cleveland

Here's what one gray iron foundry is doing about rising costs and tougher competition

■ When we decided to reclaim our core knockout sand we found that used foundry sand goes through three distinct stages in reclamation. First, it is necessary to smooth or completely remove the shells of old bond coatings surrounding the individual sand grains. Second, once the shells have been loosened from the individual grains, it becomes necessary to remove them along with undesirable debris from the sand mass as a whole. Third, the reclaimed sand should be subjected to a classifying system whereby a satisfactory grain distribution pattern can be controlled and maintained.

The amount of work performed upon the individual sand grains and a sand mass as a whole during reclamation is determined by the end use of the reclaimed product. If the sand is destined for reuse in mold facings, it is desirable only to remove dehydrated clays and burnt carbonaceous materials while retaining most of the usable bond as smooth coatings upon the reclaimed grains.

If the sand is to be reused in oil-bonded core mixtures, the elimination of clay and carbonaceous materials has to be sufficient to secure satisfactory baked properties when the reclaimed sand is compared with like-bonded new sand mixtures.

Information on the different types of reclamation systems available today can be found in SYMPOSIUM ON SAND RECLAMATION published by the American Foundrymen's Society.

We have a pneumatic reclamation system which was installed and placed in operation during October 1954. It includes equipment for screening and feeding the used sand, the pneumatic scrubbing unit proper, an air cascade-type classifier, a dust collector, and a number of dump buckets to bring used sand to the installation and transport reclaimed sand to where it is to be reused.

In operation the used sand is dumped through a heavy 3/4-in. mesh screen into a small hopper (Fig. 2). It passes outward and upward on an inclined belt conveyor extending from the hopper to a point where the sand can be discharged onto a double-deck vibrating conveyor. The belt conveyor drive is equipped with a variable-speed reducer to permit controlling the feed input from 1 to 4 tons per hour.

The upper deck of the vibrating conveyor is a screen having 1/8-in. openings. The lower deck is a pan discharging the used sand into an elevator, then into the pneumatic scrubber. A number of strips of heavy rubber belting have been mounted above the vibrating conveyor screen to serve as lump breakers, and the non-passing material is rejected at one side into a refuse bucket.

The pneumatic scrubber contains eight scrubbing cells arranged in two parallel four-cell sequences in a step-like manner (Fig. 1 and 3). The incoming sand enters through an opening located at the center rear of the scrubber housing and the sand automatically subdivides itself with one-half passing downward through each of the four-cell sequences. Each sequence discharges at the lower front of the housing into an enclosed V-shaped

Reclaimer Lengthens Life of Sand

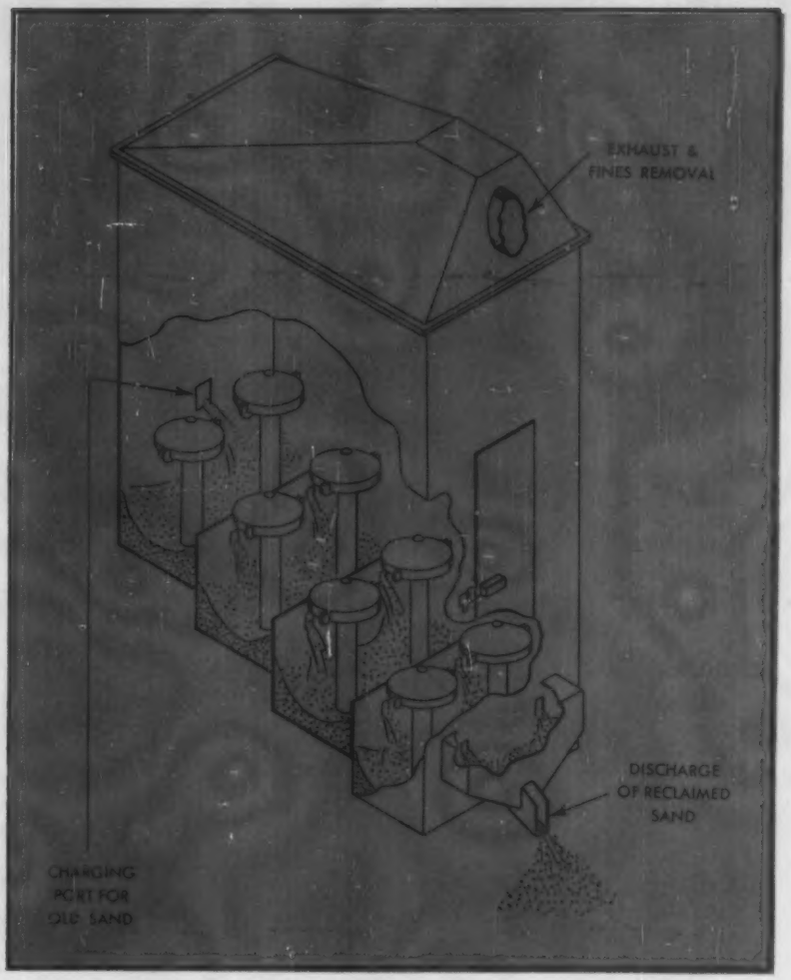


Fig. 3 . . Half of sand passes through each of 4-scrubbing cell sequences.

chute which passes the combined product into the cascade-type air classifier.

Within the classifier the sand trickles downward over a succession of inclined plates so spaced that a controllable amount of air can be drawn through between the plates to effect a separation of the reclaimed product into bank sand and lake sand. The classified sands fall into their respective buckets (Fig. 4) and are hauled to wherever they are to be reused.

A 20-mesh inclined screen mounted within the classifier housing to intercept the lake fraction is being used to remove pieces of slag, slivers of wood, and a considerable amount of steel shot.

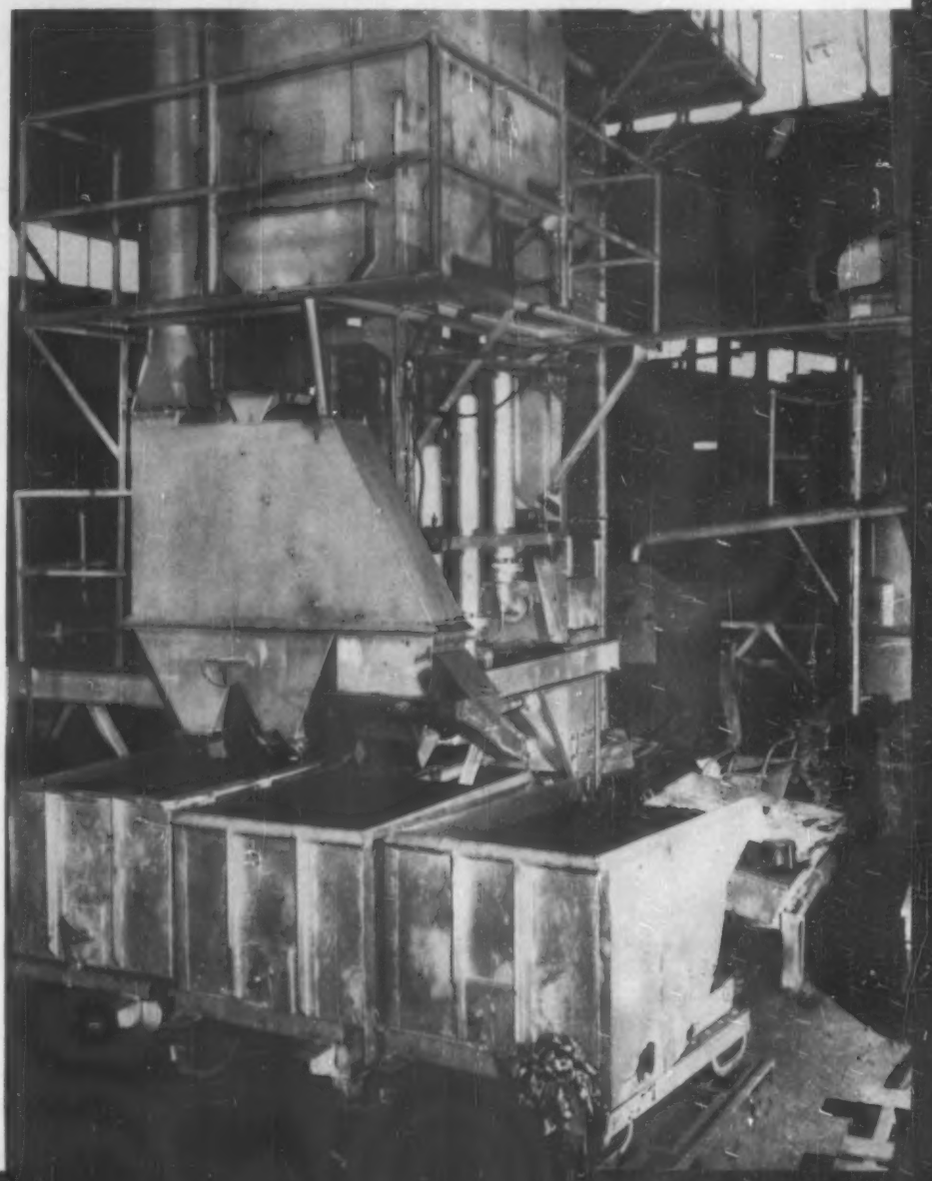
The dust-hood over the screen deck of the vibrating conveyor, the scrubber and the air-classifier all are connected with and exhausted by a 5000-cfm wet-type dust collector. Dampers in the connecting pipes permit control of the amounts of air being exhausted to suppress dust and meet classification requirements.

You can best comprehend how pneumatic force is applied by tracing the movement of sand within a single cell (Fig. 5).

The successive cells in a sequence are separated by metal partitions. Slotted openings in the partitions permit sand grains to pass onward and downward during operation. Within any one cell the incoming sand grains must move downward in the space between the interior of the "well" casing and the exterior of the center-pipe. At the bottom of the well they become entrained within a vertically moving low pressure, high velocity air stream and pass upward through the center pipe. As they emerge from the top of the center-pipe they collide with other sand grains retained within the peak of a conical target, lose their momentum, pass outward to the circumference of the target, and fall downward to again become part of the sand mass within the well.

Only the sand grains falling from

Fig. 4 . . Controlled air in classifier separates sand into bank and lake.



that portion of the conical target directly adjacent to the slotted opening in a partition have the opportunity to pass onward into the next cell. All other sand grains must remain within the cell and continue to be recycled until such time as they fall in front of the partition opening and escape to the next cell.

The abrasion and impact encountered with each cycle tends to reduce the coatings of old bond on the individual sand grains and with a sufficient number of cycles the coatings can be almost completely removed. The number of cycles received by the individual grains is related to and can be controlled by controlling the rate of feed into the scrubber. With a high input rate, the incoming sand tries to raise the levels in all of the cells and this results in more sand grains flowing through the partition slots with each cycle. Thus, with a high feed input the individual grains have less chance to linger in the cells and they require a lesser number of scrubbing cycles as they pass through the cellular sequence. Obviously, the converse is true with a lower rate of feed input.

Because of basic differences in the shape and distribution of various base sands and the types of bonding materials in use, each foundry must empirically determine what feed input rate is most compatible with obtaining the reclaimed quality they feel necessary for reusing the sand in lieu of new sand. Thus some foundries find it necessary to operate at one ton per hour to reclaim sub-angular sands for reuse in core mixtures; others are operating at four to five tons per hour in reclaiming round-grain base sands for reuse in mold facing mixes.

The first commercial pneumatic reclamation installation was placed in operation at the Duncan Steel Foundry, Alton, Ill., in October 1951. Subsequently some twenty additional units have been placed in other foundries. Although many of these were steel foundries, ours is a gray iron shop.

The installation was sold to us to reclaim used core knockout sand at a rate of two tons per hour at a quality level compatible with reuse in oil-bonded core mixtures. After a few weeks of operation it became evident that our lake and bank sands could not be treated under conditions usually applied to round-grain steel foundry sands. Seemingly, our sub-angular type sands are more brittle than round-grain sands and have to be handled with considerably lower center-tube velocities. Further, because of the pits and indentations peculiar to sub-angular sand grains, a considerably greater amount of scrubbing time is required to restore our sands.

To meet our requirements it became necessary to reduce the air input to the individual cells to thus lower center-tube velocities and minimize grain breakage. Then the reduced severity of the scrubbing action with each cycle in conjunction with the inherent characteristics of our sub-angular sands made it necessary that we reduce the output rate from two to one ton per hour.

The equipment manufacturer then initiated a series of design modifications which restored the unit to an output of two tons per hour with a minimum grain breakage, with reclaimed distributions comparable to our new lake and bank sands, and with yields approximating 90-95 percent of the sand being fed into the unit.

The most effective modification was a lengthening of the cell "wells" from 4-1/2 ft to 7-1/2 ft with a related increase of center-tube lengths from 6 ft to 8-1/2 ft. This change resulted in more sand being entrained per cfm of motivating air with the sand grains having to pass through a more lengthy abrasion zone while moving upward through the center pipes.

It is understood the information and data acquired during this modification period has aided the manufacturer in designing improved scrubber units wherein four scrubbing cells now do the work performed by the eight cells comprising our older style unit.

Most of the pneumatic reclamation installations are using dry bag-type dust collectors to exhaust the

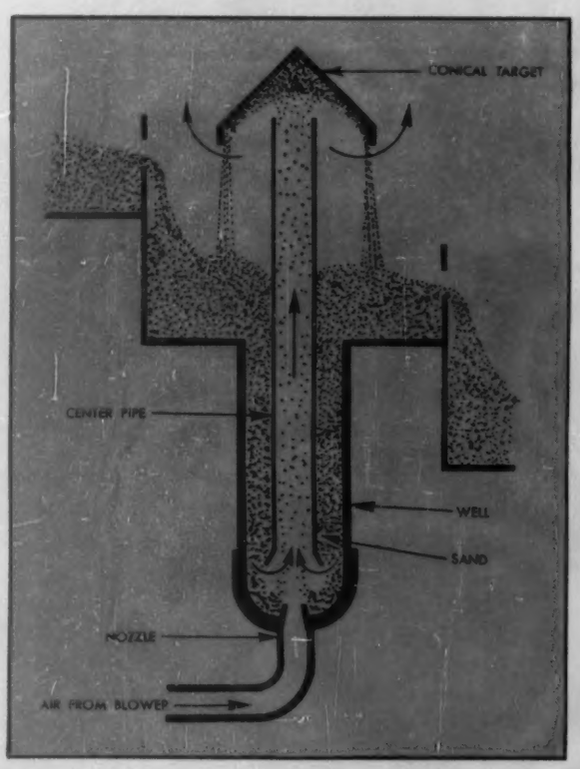


Fig. 5 . . Cross-section of cell.

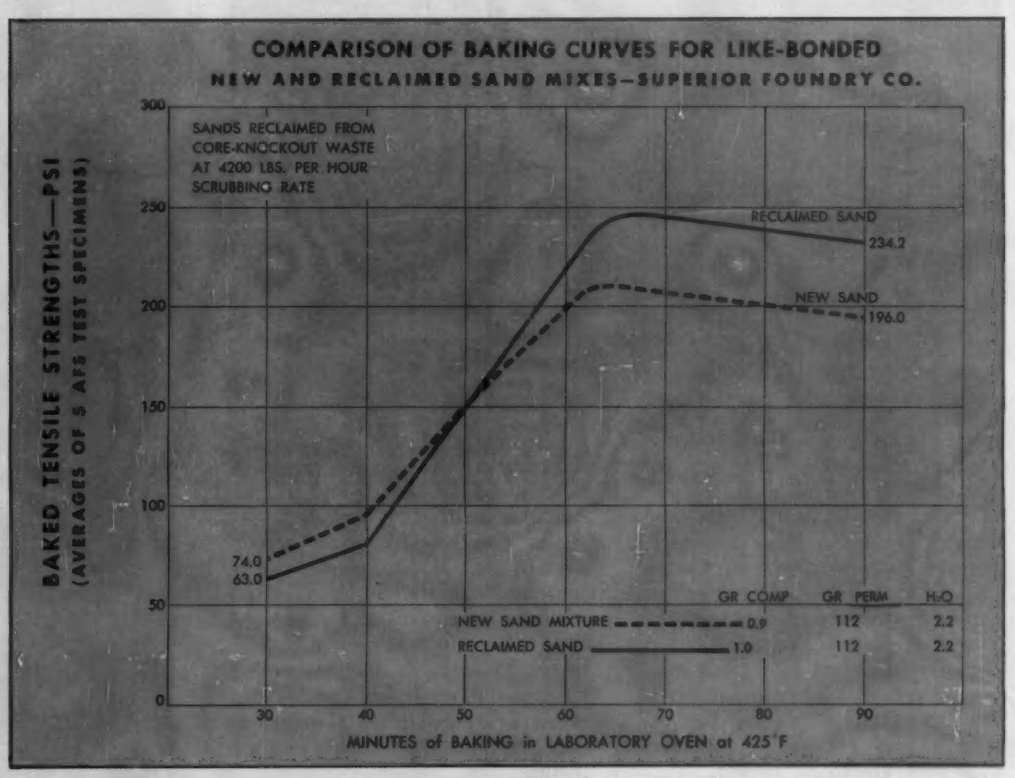


Fig. 6 . . New or reclaimed? Baking curves are similar.

scrubber and other dust-creating pieces of equipment. However, we elected to install a wet-type collector which utilizes several beds of marbles to trap dust particles and convert them into sludge. This piece of equipment also had to be modified to cope with the heavy dust load emerging from the scrubber unit.

The chief complaint centered around a tendency for the marble beds to become clogged thus reducing the cfm being drawn from the equipment units. This, of course, greatly affected the functions of the air classifier in particular and was responsible for fluctuations in the grain distributions of the reclaimed lake and bank sands. This situation has now been corrected to our satisfaction.

Maintenance Has Been Low

Outside of the work required to effect the foregoing modifications, the installation has been remarkably free of maintenance problems.

The center pipes are the only items in the scrubber that have to be replaced periodically because of wear. The pipes tend to wear out their full length on the side nearest the front end of the scrubber and their life can be greatly prolonged by rotating them 90° once a week. Because the sand is cleaner and sharper nearer the discharge end of the unit, the center pipes closest to discharge tend to wear out faster than those nearer the intake end. At present these center pipes have to be replaced after ten to twelve weeks of service and handling from 1000 to 1200 tons of sand.

The pipes are 8 ft 6 in. lengths cut from common steel 2-1/2-in. ID stock and with their hardened steel mouthpieces, spacing spiders, and conical targets, they become assemblies which can be removed readily and replaced when necessary.

We have had to replace the 1/8-in. mesh screen deck on the vibrating conveyor because the lump breakers wore a hole in it. Otherwise, we have no complaints with regard to the mechanical durability of the installation.

The filter beds in the dust collector have to be flushed manually about once a week to discourage any tendency toward clogging. Occasionally a mud ring will form at the bottom of the inlet pipe in the collector and we have to shut down for a few minutes to remove it. Several times it has been necessary to patch or replace sections of the dust collector piping because they wore thin due to the abrasive action of the dust-laden air.

On the basis of our experience to date, we believe the maintenance of the installation will continue to be very low.

A turbine-type blower is capable of supplying the scrubber unit with 2100 cfm at 4 psi pressure. In actual operation, about 1700 cfm is distributed between the eight cells at around 3 psi pressure. The turbine is being driven by a 3500 rpm, 65 hp motor.

Total horsepower requirements for the installation are:

Turbine-type Blower	60 hp
Belt-Conveyor	¼ hp
Vibrating Conveyor	1 hp
Elevator	3 hp
Dust Collector Fan	15 hp
Dust Collector Circulating Pump	1½ hp
Dust Collector Sludge Ejector	¼ hp
	81¼ hp

We are planning to install large capacity bins to temporarily store the feed and reclaimed sands and thus eliminate the need for a fork-lift operator. Such bins will eliminate the movement of sand through crowded foundry aisles since sufficient capacity will be available to permit us to transport the sand during a non-operating shift. This addition will also permit us to operate the installation on an around-the-clock basis and practically double the output now being obtained.

Reusing Reclaimed Sand

Prior to the installation of reclamation equipment, a large part of our new sand consumption reflected the addition of new sand on a daily basis to our molding system. Such additions were made primarily to control the permeability and workability of the molding sand mixtures. Since initiating sand reclamation we have added no new sand to our molding lines.

At first, some trouble was encountered in maintaining permeability and strengths until we learned to process the used molding sands with a low exhaust from the classifier. This permitted us to retain the fines and usable bond while eliminating most of the dehydrated clays and burnt carbons present in the old molding sands.

Also, some trouble arose from our unintentionally mixing part of the high-clay bank fraction of the reclaimed molding sands with the bank fraction being obtained from reclaimed core knockout sands. This experience taught us how detrimental can be the introduction of excessive clay and fines into core sand mixtures.

Our practice now is to reclaim used molding sands with a low classification exhaust sufficient to control permeability, and to discard the comparatively small amount of bank sand resulting from classification. In this manner we insure keeping this trouble-making material out of the coreroom.

While we have effected some savings by reclaiming molding sand for reuse in the molding systems, the equipment was purchased primarily to reclaim our used core knockout sands for reuse in oil-bonded core mixtures.

Through the experience acquired since modifying the equipment to meet our requirements, we have been able to establish control practices which permit us to satisfactorily reuse reclaimed sands in our core mixtures. By closely controlling grain breakage and yield, classification and grain distributions, and clay and carbon residual percentages, we have been able when desired, to effect a 100 percent substitution of reclaimed for new and obtain baked properties equal to like-bonded new sand mixtures (Fig. 6).

However, because of a recent increase in shop production and because we are unable to increase the production from the reclamation unit, we are now preparing most of our core mixtures with a 50/50 mixture of reclaimed and new sands. Eventually, when we get the proposed new bins installed, we hope to alter this ratio to approximately 75 percent reclaimed to 25 percent new in most mixtures.

Tables 1 and 2 compare properties of new and reclaimed sands.

Though we have had our share of the troubles that usually accompany the pioneering of a new development, we are firmly convinced that pneumatic reclamation can be successfully applied to used gray iron foundry sands.

The joint experience of ourselves and the manufacturer will undoubtedly benefit the installation of pneumatic reclamation in other foundries in the future. However, one must recognize the problems peculiar to the sand practices of the individual foundry and be willing to establish and maintain the control measures necessary for obtaining consistent results.

TABLE 1 . . SAND CHARACTERISTICS—NEW AND RECLAIMED

Screen	New Bank	Recl. Bank	New Lake	Recl. Lake
30	....	....	0.38	0.20
40	0.12	0.30	4.64	5.10
50	1.32	2.10	24.86	27.50
70	11.14	13.90	46.10	41.30
100	32.54	39.50	23.36	21.30
140	31.28	27.94	0.66	3.50
200	18.84	14.30	....	0.60
270	3.10	1.60	....	....
Pan	1.66	0.50	....	....
GFN*	97.7	88.2	51.4	52.5
% AFS Clay	0.60	0.75	0.022	0.430
% Combustible	1.60	2.72	0.028	0.880

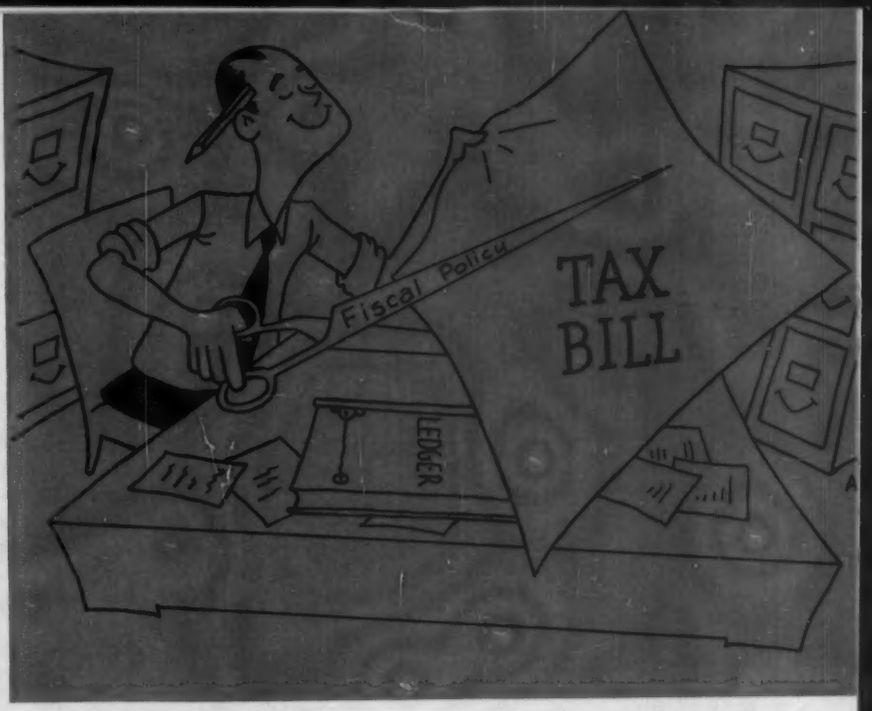
* AFS Grain Fineness Number

TABLE 2 . . TYPICAL PROPERTIES OF NEW AND RECLAIMED SAND MIXTURES

	New Sand	Reclaimed
New Lake	1350 lb	....
Recl. Lake	....	1350 lb
New Bank	450 lb	....
Recl. Bank	....	450 lb
Cereal	22 qt	22 qt
Core Oil	12 qt	12 qt
Water	4.0 gal	4.0 gal
Green Perm.	99	112
Green Compr.	0.95 psi	1.0 psi
Moisture	2.3%	2.2%
Baked Perm.	122	138
Baked Hardness	82-98	85-94
Baked Tensile	251 psi	242 psi

HOW to SAVE on TAXES

Legitimate shifts in record-keeping methods may be advised



■ You may be able to cut your own tax bill—honestly—whether or not the federal income tax rates are reduced.

To do this you need to know the tax effect of various choices. Your choice of a method of handling a particular transaction can raise or lower your taxes, and sometimes you can save money by a legitimate shift of taxable income or deductions from one year to another. Also allowed is a choice in the treatment of items such as depreciation and research costs.

Many firms could reduce their tax burden if they were aware of the tax considerations affecting a variety of transactions. The most feasible means for many is to keep alert to tax saving opportunities is frequent consultation with a properly qualified advisor.

■ **Choice of depreciation method.** Certain tax-saving steps are still possible at tax-filing time. One of them is the proper choice of depreciation method. The first step is to determine the estimated useful life of any asset acquired during the tax year. Every foundryman should have a copy of *"Bulletin F,"* which contains tables of "average" useful lives. It is available from the Superintendent of Documents, Government Printing Office, Washington 25, D. C., for 30 cents.

The simplest method is straight-line depreciation. Just divide the cost (less what you expect to sell it or trade it in for when it is replaced) by the number of years of estimated useful life, and deduct this amount each year.

The law now specifically permits several other methods of depreciation for new assets having a useful life of three years or more. One of them is known as the declining balance method. In the first year the depreciation rate is twice what it would be under the straight-line method. The next year the same rate is applied to the amount remaining to be depreciated.

The result is that a greater proportion of the cost is depreciated during the early years of the life of the asset.

Another new method, known as "sum of the years' digits," has a similar effect.

These methods of rapid depreciation may be particularly helpful to a company which is currently making large outlays for new equipment, but the depreciation left for the later years of the asset's life will be less than under the straight-line method.

■ **Research and Development.** Another choice confronting the taxpayer is whether to treat research and development costs as immediately deductible expenses or to amortize them over a period of years. The immediate deduction is certainly a "bird in the hand" and may be very attractive to a company which needs this tax benefit to help finance the undertaking.

The company which can afford to spread the cost over the estimated useful life (or at least sixty months if the useful life cannot be determined) may find this best.

■ **Being taxed as a corporation.** There is a provision in the 1954 Internal Revenue Code which allows some proprietorships and partnerships to be taxed as if they were corporations (there is considerable uncertainty about the provision).

■ **Choice of fiscal year.** Regulations now permit changes of fiscal year in some cases without permission of the Treasury Department. Generally it is wise to use the fiscal year which corresponds most nearly with the annual cycle of business operations, ending at the low point of receivables, inventories and loans.

■ **Sickness and accident benefits.** Under the present tax law, payments from your company to employees for treatment of sickness or injury are not taxed as income of the employees. If the company has a plan for continuing all or part of an employee's pay while he is absent for sickness or injury, limited amounts of this "sick pay" are also tax exempt.

This applies whether the payments are made by the company or by an insurance company. In the case of a sickness requiring hospitalization even for one day during the course of the illness, or in the case of *any* injury, the first $100 per week of payments are tax free. In the case of sickness which does not require as much as a day's hospitalization, the exemption begins after the first week of absence.

■ **Repairs and improvements.** If you contract for repairs and improvements to your business property, be sure that these two types of work are billed separately. Should you lump them together, you may find that the entire cost has to be capitalized for future depreciation. By listing the cost of repairs as a separate item you are allowed to deduct it as an expense of the current year.

■ **Keeping good records.** Many deductions are lost through failure to keep adequate business records. Good records will show what deductible expenses you have had, and will back up deductions in case they are questioned.

■ Information for this article was supplied by the American Institute of Accounts, the national organization of Certified Public Accounts.

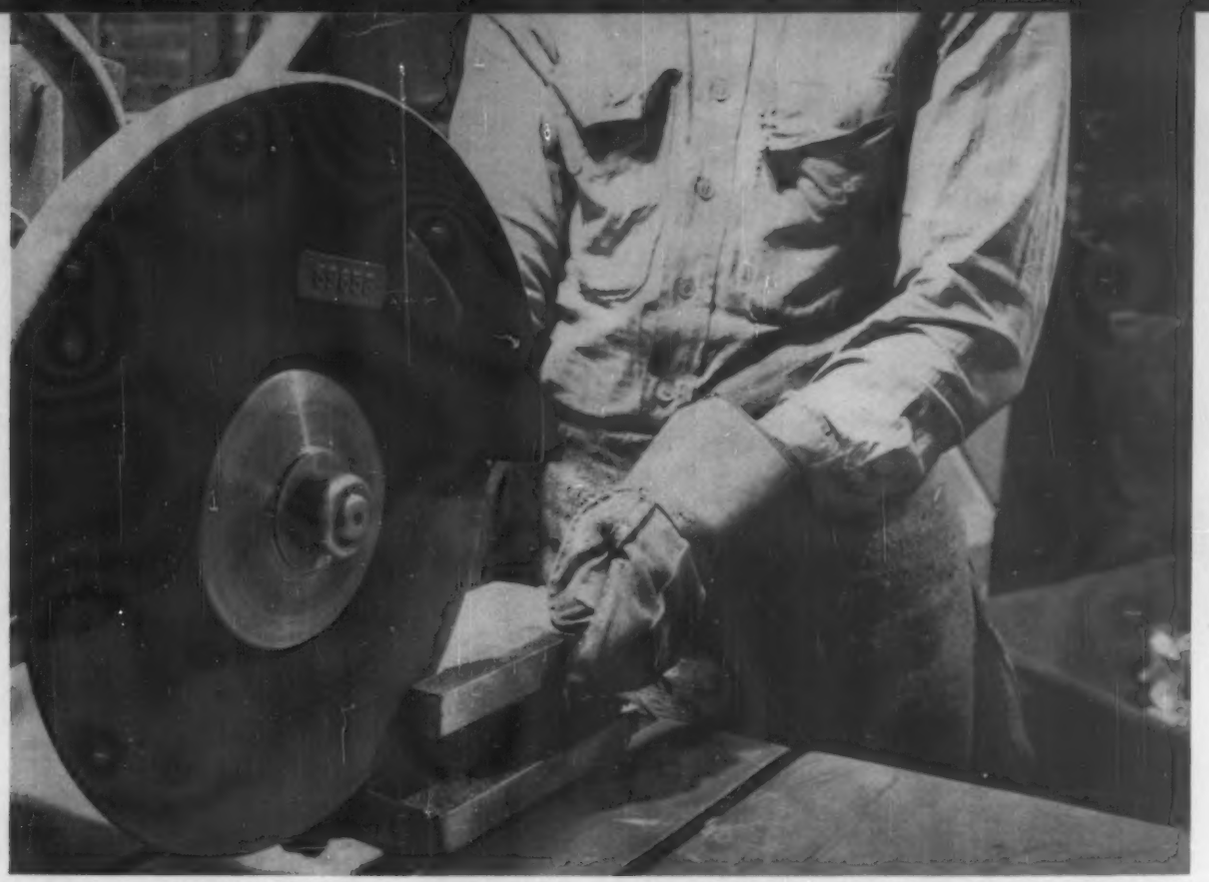


Fig. 1 . . Specimen of high solidification shrinkage alloy is machined from material removed from the double keel block.

HOW to MAKE GOOD TEST BARS

FRANK J. DANIELS / *Product Development Director*
George Sall Metals
Philadelphia

Select the proper test casting then standardize melting and pouring procedures

■ Since customers calling for test bars reject castings associated with unsatisfactory tests, it is extremely important that foundrymen know the salient factors in the production of high quality test bars.

It should be understood that, although test bars do not necessarily indicate actual physical properties of the castings involved, they do show if the casting metal is up to specifications.

First step in making specification test bars is to select the proper type of test casting for the metal, since test results for the metal may vary with the casting type.

In almost all instances, test bars for aluminum alloys must be cast to size, as machining reduces physical properties (Fig. 2). Casting bars to size is not easy. Accurate patterns are a must. A match-plate is no doubt the best and most accurate pattern. If mold shifting occurs, test bars should be discarded and new ones cast.

Gating and risering of the double keel block (Fig. 3) is well suited for copper-base alloys with extensive solidification shrinkage such as manganese and aluminum bronzes. The legs of the keel block are removed (Fig. 1) and machined to size (Fig. 6).

Bars from either the grip-web (double crown or double vertical, Fig. 4) or the double horizontal full-web (Fig. 5) test casting are suitable for red brass, yellow brass, silicon bronze, tin and leaded tin bronze, *but should not be used for aluminum bronze and manganese bronze*. Bars are removed from the gating system and machined.

After deciding on the proper test casting it is necessary to standardize all other procedures to insure high quality castings.

- Incorporate the gating and risering system into the pattern (don't leave it to the molder's judgement). Use accurate patterns, especially for cast-to-size aluminum bars.
- If green sand is used, shoot for high permeability; hold moisture to a minimum; use sufficient clay bond.
- Dry sand molds should be baked dry, but not so hard as to crack hot-short, high leaded alloys.
- Determine pouring temperatures giving best results; always use a pyrometer and keep accurate records.

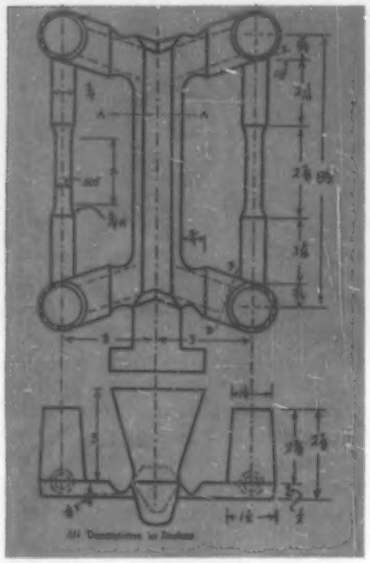


Fig. 2 . . Design and dimensions of aluminum double bar casting.

Metal	Pouring Range
Aluminum Alloy 12, 108, A108 319, 195	1225-1275 F
355, 356, 43	1200-1250 F
Red Brasses	1975-2050 F
Yellow Brass Manganese Bronze Silicon Bronze	1875-1975 F

■ Keel blocks of aluminum bronze alloys should be removed from the sand as soon as possible (generally in about 25-30 min). Although shakeout time is not as critical for

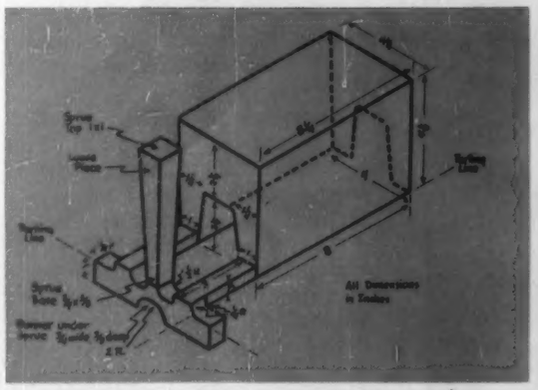
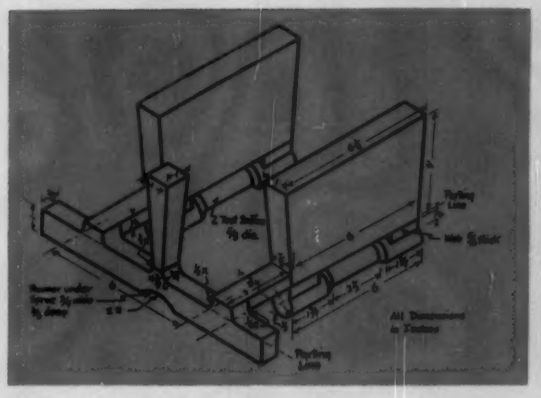
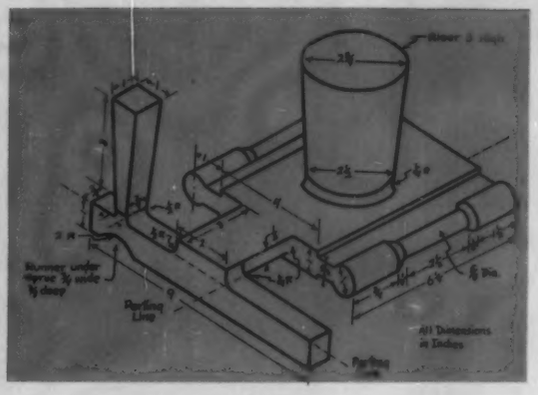


Fig. 3 . . Double keel block is fine for copper-base alloys like manganese and aluminum bronze.



Grip-web (double crown or vertical) test casting (Fig. 4 above) or double horizontal, . . .



. . . full-web (Fig. 5 above) for red, yellow brass; silicon, tin, and leaded tin bronze.

manganese bronze, it may be handled in this way also.

Other copper-base alloys can remain in the sand for longer periods of time, but it is well to establish a definite shakeout time of not more than an hour as standard procedure.

Aluminum alloy test bars may be removed from the sand in 15-30 min; a good time is 25 min.

■ Melting and pouring are perhaps the most important factors for obtaining sound bars of good physical properties.

All metals should be poured from ladles or crucibles with the lip close to the sprue or pouring cup. To facilitate pouring place the sprue hole as close to the end of the mold as can be arranged. High pouring results in increased air entrapment and turbulent feed and possibly defective test bars.

Melting aluminum alloys. Perhaps the principal difficulty in obtaining sound aluminum castings or test bars is the ability of aluminum and its alloys to readily absorb hydrogen. This results in pinhole porosity.

It is always difficult in commercial practice to eliminate pinhole porosity and practically impossible to detect it before castings are machined. However, good practice is to degas the metal prior to pouring with chlorine or dry nitrogen.

Dry nitrogen is generally preferred as it is an inert gas and simply removes hydrogen by mechanical action, i.e., hydrogen diffuses through the molten metal to the bubbles of nitrogen and escapes with them.

It is necessary, however, to use chlorine for degassing aluminum-magnesium alloys such as 214 and 220. In this case, where oxides are to be avoided, magnesium chloride, which may be formed, rises to the top of the melt and is readily skimmed off.

Remember, any oxide inclusion is bad for aluminum test bars. Generally speaking, if an oxide inclusion is on the outer part of the bar, tensile strength will be reduced; if the inclusion is below the surface, reduction of elongation will be noted.

If nitrogen is used for degassing, be sure it is the dry type, because moisture breaks down at the temperature involved and promotes pickup rather than removal of hydrogen.

Melting copper-base alloys. Advantage is taken of the ability of copper-base alloys to absorb oxygen as well as hydrogen for holding down hydrogen pick-up by melting in an oxidizing atmosphere. Increasing the metal oxygen content reduces the solubility of hydrogen. It is then possible to use a reducing agent such as phosphor-copper (generally in the form of 15 per cent phosphorus copper shot or waffle) just prior to pouring to reduce the oxygen content. Resulting low oxygen and hydrogen content is consistent with their solubility at room temperature and means that no gas holes will appear in the casting.

Different copper-base materials require revisions in melting practice to help eliminate the gas problem.

Alloys such as red brass, yellow brass, and manganese bronze containing strong deoxidizing elements may be melted in an oxidizing atmosphere with no bath cover. This practice facilitates the pick-up of as much oxygen as possible which in turn limits the amount of hydrogen which can simultaneously dissolve in the metal.

Alloys containing elements which are stronger deoxidizers than copper itself (aluminum, silicon, and phosphorus bronzes and beryllium copper) will not pick up oxygen when melted in an oxidizing atmosphere. The best way to keep the hydrogen content of such alloys to a minimum is to provide a melting atmosphere of minimum moisture vapor pressure. In view of this, it is best to melt under a cover of 1½-2 in. of dry charcoal whenever possible.

The best way to dry charcoal which readily absorbs moisture from humid atmosphere is to charge most of the cover into the crucible while preheating. When the crucible and charcoal are red, moisture may be considered adequately reduced.

Use two ounces of 15 per cent phosphor-copper shot per 100 lb for deoxidizing red brasses and tin bronzes. For high leaded tin bronzes such as 83-7-7-3 and 80-10-10, use three to four ounces per 100 lb of metal.

■ If all of the following recommendations are carefully adhered to any foundryman can produce high quality test bars:

1. Melt as quickly as possible.
2. Degas or deoxidize.
3. Don't stir the metal.
4. Skim carefully before pouring.
5. Pour as soon as metal reaches temperature.
6. Avoid splashing and turbulence.

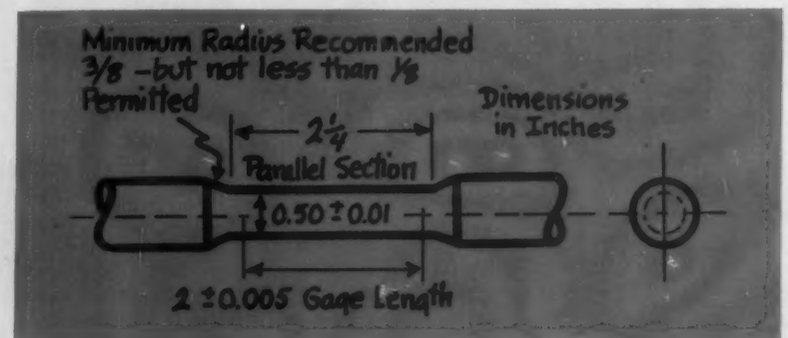
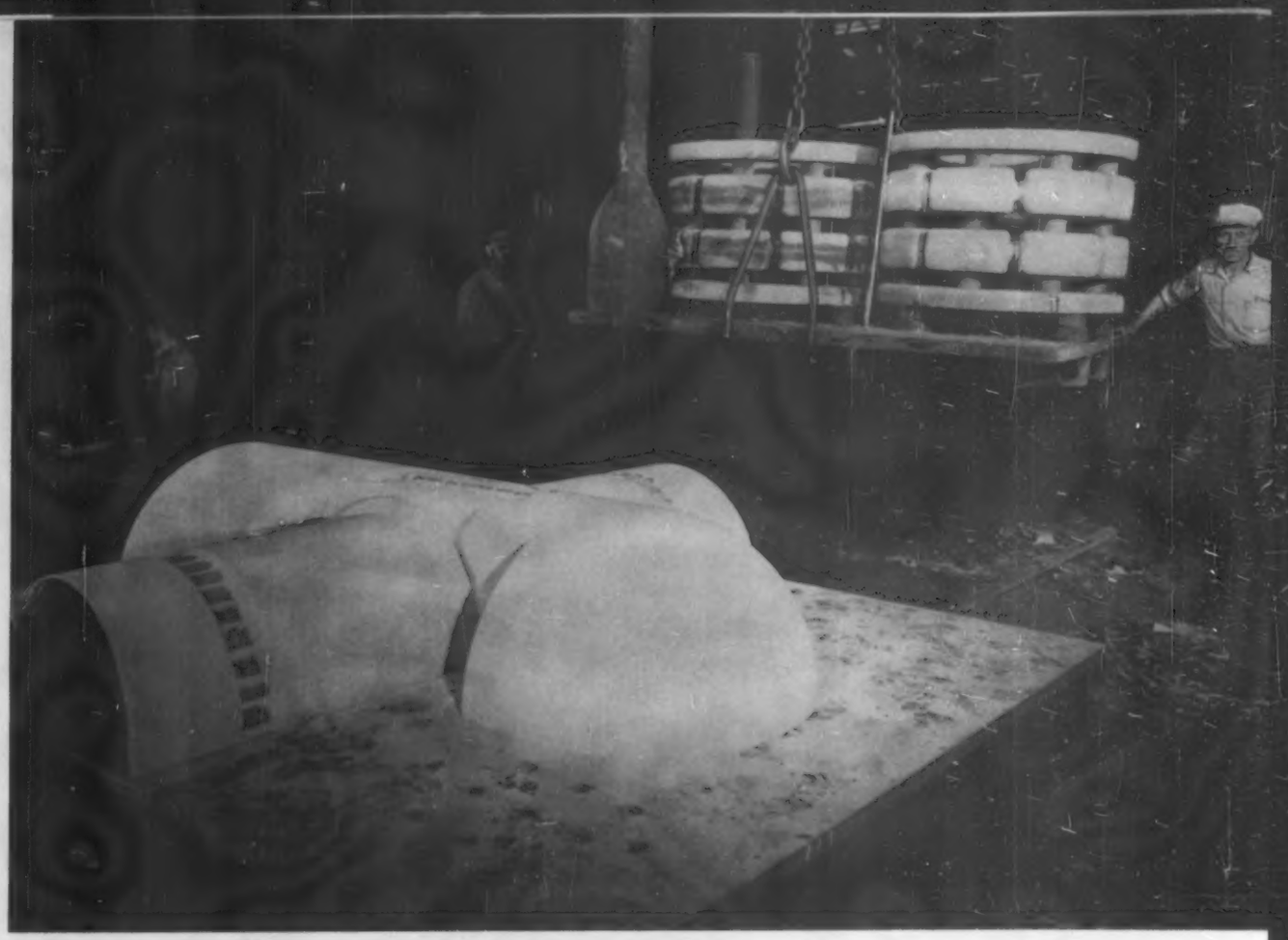


Fig. 6 . . Reduced section of standard tension test specimen shall be gradually tapered with ends 0.003-0.005 in. larger in diam than center.



3000-lb valve core containing 200 lb of zircon facing at chill and fillet areas is washed with a zircon preparation.

5 Ways to Use ZIRCON SAND

90¢ worth of zircon saved $13 in cleaning

ALBERT L. KREUER / *Orefraction, Inc., Pittsburgh, Pa.*

■ Zircon, or zirconium silicate, commonly known to the industry as zircon sand has become a useful tool in equalizing the rising cost of casting metal. Used with new techniques, methods, equipment, and mechanization, zircon has aided in reducing costs once considered to be fixed.

Cost reduction of this nature was recently observed in an up-to-date Milwaukee foundry which found that a casting costing $16 to clean could be cleaned for $3 when 90¢ worth of zircon was used in facing troublesome spots.

Zircon's versatility by reason of its many unique properties has made a place for it wherever metals are cast. Its rapid rate of heat transfer is found to be one of the chief advantages, enabling it to be used as a solid core or mold material, or as a facing.

As a mold facing, zircon sand may be used with increasing depth at the point of heavy or difficult sections, or in a deep pocket, or as a replacement for metal chills.

Shell molding has brought out further information in the use of zircon. Some types of binders, such as liquid resins and cold-setting binders, and some oils will not bind as well on uncalcined zircon as they will on calcined zircon. This is caused by the organic coating found on zircon sand grains before they are calcined. The amount of this coating will vary and the results obtained in binding uncalcined zircon sand will vary accordingly.

Domestic zircon sand, produced in Florida, is calcined, removing all of this coating and any other substances that may interfere with its normal good behavior and, in a great many instances, has removed the element of doubt from the mind of the coremaker.

The use of milled zircon or flour has been found to have advantages where silica flour cannot be used, and greater strength or superfine finish is desired—caution should be used in this practice since an excess of zircon flour may close up the core and cause a blow.

TABLE 1 . . FIVE WAYS TO USE ZIRCON SAND

1 . .	Core sand mix with chill action:	
	Zircon sand	100.00 lb
	Nail clippings or small scrap	100.00
	Core binder	3.00
	Western bentonite	2.00
	Corn flour	1.00
	Water	6.00
2 . .	Core sand mix with hot strength:	
	Zircon sand	100.00 lb
	Corn flour	0.50
	Western bentonite	0.50
	Core Oil	1.00
	Water	2.50
3 . .	Core sand mix with moderate hot strength:	
	Zircon sand	100.00 lb
	Core oil	0.70
	Corn flour	0.70
	Water	2.00
4 . .	Facing for steel castings molds:	
	Zircon sand	100.00 lb
	Western bentonite	2.25
	Corn flour	0.50
	Water	3.00
5 . .	Green sand mix for any metal:	
	Zircon sand	100.00 lb
	Western bentonite	1.50
	Water	1.50

J. D. SHELEY/*Asst. Works Mgr.*
Black-Clawson Div.
Black-Clawson Co.
Hamilton, Ohio

Burned-back lining of acid cupola is covered with approximately two inches of gunned-on basic refractory.

IT'S EASY TO TRY BASIC

Make low-cost trials by air-placing basic refractory on regular acid lining

■ The great amount of information on the method and advantages of operating a basic lined cupola has undoubtedly encouraged many to investigate the process only to be discouraged by estimates of the cost of necessary materials.

When we became interested in the operation of basic lined cupolas several years ago, there was very little information available, especially with regard to cupolas of 60-in. diameter. To obtain operating experience, cost figures, and metallurgical results, we gunned a basic refractory directly over acid brick in the same manner in which daily patching was applied in normal operation.

This procedure should not be used for continued production since the consumption of patching material would be great and control of the basic slag would be impossible once the slag reached the acid cupola blocks.

In preparation for these experiments, the lining of one cupola was permitted to burn back slightly more than normal. Approximately two inches of basic refractory was then applied with a pneumatic refractory gun to the well and melting zone. In addition, the well was faced with a graphitic material. Because cupolas were rear slagging, materials for the breast and spout were not changed.

To minimize difficulties, experimentation was scheduled for days with rather short heats (15 to 20 tons) when castings requiring tensile strengths of 40,000 to 45,000 psi and/or high surface finish were not being poured.

The information we gained caused us to immediately convert cupolas to full time basic operation. Rear slagging, which had proved unworkable in experiments, was replaced with continuous tapping, front slagging. Basic materials were used for the breast and spout.

Other founders, encouraged by our success with gunned-on basic, have tried this method and have reported satisfactory experimental results at a cost far below the original estimates for trying basic lining in their production cupolas.

AFS Nominates Officers and Directors

Frank W. Shipley

Harry W. Dietert

■ Frank W. Shipley, foundry manager, Caterpillar Tractor Co., Peoria, Ill., has been nominated for the presidency of the American Foundrymen's Society for 1956-57. Now vice-president, he was named to succeed the present president, Bruce L. Simpson, president, National Engineering Co., Chicago, by the Nominating Committee in Chicago, December 12. Mr. Shipley was a national director of AFS from 1950 to 1953 and has been active in many other activities of the national organization and of the Quad City and Central Illinois chapters. The AFS committees on which he has served include By-Laws, Nominating, Retirement, Textbook and Education. While serving with the education group, Mr. Shipley worked to prepare the AFS program of high school and college foundry textbooks. Shipley helped organize the Central Illinois chapter and is a past chairman.

■ Harry W. Dietert, chairman of the board, Harry W. Dietert Co., Detroit, was named to succeed Mr. Shipley as vice-president for 1956-57. Mr. Dietert, now a resident of Kerrville, Texas, founded his company in 1925 and has authored numerous articles and papers since delivering his first paper to AFS in 1923. Dietert presented the Hoyt Memorial Lecture at the 1954 AFS Congress.

The six men nominated to serve as national directors for three-year terms are:

■ Roger W. Griswold, superintendent, foundry division, Erie Malleable Iron Co., Erie, Pa., representing Malleable (Chapter Group E—Northwestern Pennsylvania Chapter). Mr. Griswold organized and was first chairman of the Northwestern Pennsylvania Chapter.

■ Herbert Heaton, foundry superintendent, Letson & Burpee, Ltd., Vancouver, B. C., representing Gray Iron, Brass & Bronze, Aluminum (Chapter Group R—British Columbia Chapter). Mr. Heaton is a past chairman of the British Columbia Chapter and is active in the educational work of AFS.

■ Garnet P. Phillips, general supervisor of foundry research, International Harvester Co., Chicago, representing Gray Iron (Chapter Group K—Chicago Chapter). Active member of four technical societies, Phillips is a past chairman of both the Chicago and the Quad City AFS chapters and author of numerous papers.

■ Alex W. Pirrie, vice-president of manufacturing, Standard Sanitary & Dominion Radiator, Ltd., Toronto, Ont., representing Gray Iron (Chapter Group D—Eastern Canada Chapter). A one-time patternmaker, Mr. Pirrie has been active in AFS in Montreal and Toronto for over 20 years.

■ R. V. Righter, plant manager, Central Foundry Div., General Motors Corp., Danville, Ill., represent Gray Iron and Malleable (Chapter Group J—Central Indiana Chapter). Mr. Righter serves on the Foundry Educational Foundation industry advisory committees to both the University of Illinois and Purdue University. Aside from industrial activities, Mr. Righter is active in the national activities of the YMCA.

■ Gerald R. Rusk, President, Freeman Supply Co., Toledo, Ohio, representing Supplies (Chapter Group H—Toledo Chapter). Mr. Rusk is a past chairman of the Toledo Chapter and has been active as a supplier to the industry.

■ President Simpson will automatically become a director for one year when he leaves the office of president.

Another director will be nominated at the February meeting of Board of Directors.

All incoming officers and directors take office the day after the close of the Annual Meeting, or May 10.

Up to 45 days prior to the date of the Annual Business Meeting, additional nominations may be made by written petition signed by 200 members in good standing and filed with the AFS Secretary, according to the By-Laws.

Members of the Nominating Committee are: Frank J. Dost, *chairman*, Sterling Foundry Co., immediate past president of AFS; Collins L. Carter, Albion Malleable Iron Co., past president; W. T. Shute, Canadian Car & Foundry Co., Ltd.; C. O. Schopp, Link-Belt Co.; W. D. McMillan, International Harvester Co.; Earl White, M. A. Bell Co., and Howard H. Havies, Vivian Diesels & Munitions Ltd.

Roger W. Griswold

Herbert Heaton

Garnet P. Phillips

Alex W. Pirrie

R. V. Righter

Gerald R. Rusk

Downfall

The pattern was simple and perfectly smooth,
Loose pieces fit nicely, right in the groove.
But in looking it over, it seemed to me
That some dad-blamed patternmaker, he
Had painted a core print where metal should be.

I called to the boss when he came by my floor.
He said, "If it's yellow, it must take a core.
Red and black is metal and core prints are yellow,
And that's all we've got to go by, fellow."
(Still somehow or other, it seemed to me
That some doggoned patternmaker, he
Had painted a core print where metal should be.)

In the core room they couldn't find a core
To fit that print, though they tried three or four.
But they cut one out of an old runner cup,
I set it in and closed the mold up.
(But I had my doubts, for it seemed to me
That some dad-ratted patternmaker, he
Had painted a core print where metal should be.)

Next day came the super from the chipping room.
Saying, "Come with me, you simple goon.
Come look at this casting you made for me
With a hole in the middle where metal should be!

You're getting dumber as you get older
You crazy galoot! Who called you a molder?"
(And so my suspicions were right, you see,
Some dad-gummed patternmaker, he
Had painted a core print where metal should be.)

So I left the foundry, and after a rest,
Got a job on the section. (S. P. & S.)
Because some damned patternmaker, he
Had painted a core print where metal should be!

From *Rammed Up and Poured* by Bill Walkins, editor, *The ESCO Ladle*, copyrighted by Electric Steel Foundry Co., Portland, Ore.

A MODERN CASTINGS BONUS

Condensed from the Symposium on Non-Destructive Testing presented at the 1955 AFS Convention.

Foundrymen find that non-destructive testing helps them hold their present business and make new sales.

NON-DESTRUCTIVE TESTING

Photograph courtesy
Auto Specialties Manufacturing Co.

What Non-Destructive Testing Can Do For You

■ Increasingly stiffer service requirements and decreasing factors of safety required by designers call for more and more critical inspection of castings. This requires methods far more searching than external visual inspection of surfaces. It requires use of the various tools of non-destructive testing which reveal the nature of the interior of a casting without the need for sectioning or destroying.

Fullest use of non-destructive testing can only be made through close cooperation of management, designers, and metallurgists. They must, for example, show the customer that non-destructive test proof of the existence of a flaw or defect does not in itself express the influence of that undesirable condition upon the strength or ultimate serviceability of the component tested. Unfortunately there is a serious lack of specific information on the influence of defective conditions.

The non-destructive test cannot supply this knowledge. It cannot work miracles or make up for lack of specific knowledge of the causes of service failures or operating difficulties. *Only destructive tests or operating experience can supply this information, usually by comparing test coupons or parts free from flaws with those containing known defective conditions*

Proven correlation must exist between the property actually measured by the specific non-destructive test used and the strength or serviceability property predicated from the measurement.

From my own experience in the early days of World War II, which has been corroborated by much authoritative data in the literature, I am convinced that millions of dollars worth of finished parts and thousands of man-hours were lost primarily in the aircraft industry, as a result of radiographic rejection of castings.

Numerous non-destructive tests are available to the castings producer. An adjacent table lists the principal types; much reference material is available in the literature concerning their value and application.

TABLE 1 . . NON-DESTRUCTIVE INSPECTION OF CASTINGS

*1. Visual Inspection
2. Sound or Percussion Inspection
3. Impact Test
*4. Pressure Test
Water
Steam
Air
*5. Radiographic Examination
X-ray Radiography
Gamma-Ray Radiography
Fluoroscopy
Radioactive Isotopes (Cobalt 60)
*6. Magnetic Particle Inspection
Dry magnetic particle method
Fluorescent Wet Magnetic Particle Method
Fluorescent Penetrant Inspection
Filtered Particle Test
*7. Electrical Conductivity
8. Magnetic Analysis
Cyclograph
Magnetic Analysis Comparator
9. Supersonics (Mechanical Vibration)
Supersonic Reflectoscope
Immersion Ultrasonic Scanner
*10. Experimental Stress Analysis
Brittle Lacquer Technique
Strain Gages
Photoelasticity
*11. Chemical Spot Tests
Process Defect Test
Inherent Defect Test
12. Hardness Testing

* Most commonly used

A second table lists the defective conditions most frequently recognized as a result of non-destructive procedures.

Some of the properties actually measured by typical non-destructive tests of special interest to foundrymen include:

1. Geometric properties such as size, shape, thickness, and porosity.
2. Mechanical properties such as elasticity and hardness.
3. Metallurgical properties of structure and composition such as segregation, and grain size.
4. Magnetic properties such as magnetic permeability.

There is no universal non-destructive test applicable to every kind of material under all operating conditions. Use of each non-destructive test must be worked out with a full understanding of the function of the part being tested.

While the scope of equipment available for non-destructive testing is almost limitless, a few relatively simple, well-proven installations that should satisfy the average needs of commercial foundries are described in this Bonus Section.

Radiographic terminology has been developed for castings and welds by the American Society for Testing Materials. It will facilitate appreciably the application and increase the value of non-destructive testing if a common terminology is developed.

TABLE 2 . . FLAWS MOST FREQUENTLY RECOGNIZED THROUGH NON-DESTRUCTIVE TESTING

1. Inadequate Dimensions or Sections	
2. Improper Materials or Structures	
3. Improper Alloying or Heat Treatment	
4. Casting Defects	
Misruns	Inclusions
Porosity	Segregation
Shrinkage	Blow-holes
Dross	
5. Plating Defects	
Pits	
Bubbles	
Thin Spots	
6. Machining and Grinding Defects	
Surface stress concentrations	
Grinding cracks	
Regions of cold working	
7. Welding Defects	
Oxide inclusions	
Unbonded welds	
Insufficient penetration	
Porosity	
8. Service-Incurred Defects	
Corrosion	
Pitting	

Condensed from "Non-destructive Testing, a Valuable Tool for the Foundryman" by Hans J. Heine, technical director, American Foundry-

men's Society, an introduction to a symposium jointly sponsored by AFS and the Society for Non-Destructive Testing during the 1955 AFS Convention.

Bibliography

1. McMaster, Robert C., and Samuel A. Wenk, "A Basic Guide for Management's Choice of Non-Destructive Tests," *Special Publication* No. 112, American Society for Testing Materials, Philadelphia, 1951.

2. Van Horn, Kent A., "Discontinuities in Cast and Wrought Products." *ibid.*

3. Juppenlatz, John W., "The Role of Non-Destructive Testing in the Economics of Castings," *ibid.*

4. Ball, Leslie W., "Management's Responsibility for Insistence on Non-Destructive Testing in the Development of New Engineering Products and Processes," *ibid.*

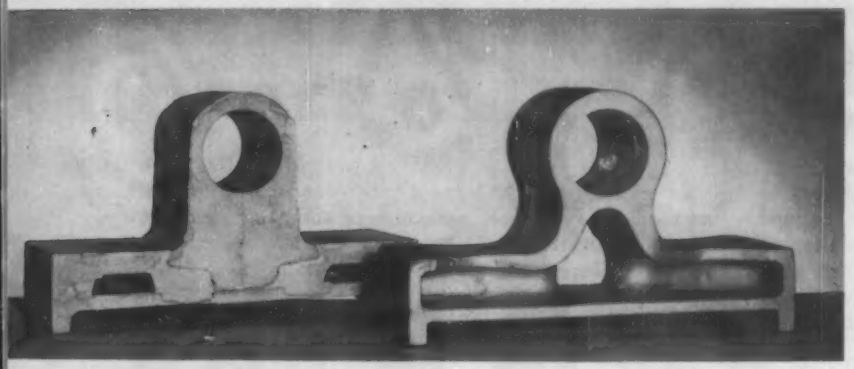


Fig. 1 . . Redesigned pillow block (right) has practically no defects, is 50% stronger, easier to pour, and 10% cheaper with increased profit.

Increasing Foundry Profits

■ **Hold and increase business.** These are the greatest profit potentials in the use of non-destructive testing.

These tools can be used to:

1. Make a part easier to cast
2. Reduce weight
3. Convert parts from other means of fabrication
4. Get customers to look to the foundry

As long as so few design engineers have any knowledge of foundry practices, and as long as the foundryman will try to make a casting from any blueprint or pattern furnished to him, castings will continue to be sold by the pound —not by the piece as engineered material. What's worse, a lower percentage of parts will be cast.

Historically, foundry customers have **bought** castings; castings too seldom have been **sold.** Any appreciable expansion in casting sales has been primarily the result of an expanding economy, not of broadened application.

Here's an example of how these tools pay off. Figure 1 shows a casting with a record of no service failures. With the customer's permission, the casting was redesigned because it was difficult to pour, scrap losses were excessive, and profits low. Using techniques described elsewhere in this Bonus Section, a part was developed that was 50 per cent stronger and much easier to pour. Strength increase was incidental in this case. Profit margin was increased—although price was reduced 10 per cent—because there was practically no scrap loss due to defects. The redesigned casting has a much better appearance.

Redesign cost only 36 man-hours!

In cases of part failure due to poor design, the chances are that failure occurred through a defect or stress raiser, and the foundry is blamed for lack of dependability. Non-destructive test methods may indicate not only the need for design changes but also for changes in production methods that will eliminate defects. Any foundry that doesn't have a radiographic source is probably losing a minimum of 2 per cent saleable product. One firm has attributed the reduction of salvage welding from 22 to 5 man-hours per ton directly to corrective action indicated by magnetic particle testing.

Foundry customers need education in the use and value of non-destructive testing. A number of foundrymen have either refrained from installing non-destructive test equipment, or keep it hidden for fear their customers will insist on, say 100 per cent inspection. Few customers would arbitrarily impose extra cost without justification. But when such acceptance tests are imposed because of loss of machine time, field failure, or poor appearance, the tendency is invariably to make the tests more stringent than necessary.

Far too little is known about the significance or effect of various types of discontinuities on part serviceability or fatigue life. We do know that parts with holes appropriately located can be much stronger than the same structures without them. And the size of a discontinuity is relatively unimportant compared to its orientation or shape.

If a customer can be assured of a complete lack of minor cracks in the areas of highest stress, then there should be no need to even look elsewhere. Stress analysis will determine these critical areas and also indicate where discontinuities are unimportant. One firm's defini-

INSPECTION REQUIREMENTS OF ONE FOUNDRY

CRITICAL . . Endangers life and limb. Defects in this category not acceptable.
MAJOR . . Defects which through application and use will bring about early failure and/or gratis service.
MINOR . . Factors not included above which in themselves create manufacturing losses with interference in assembly.

tion of critical, major, and minor defects is shown in the adjacent table. Areas on a casting may be so indicated. A sampling inspection with non-destructive methods will be all that is necessary to assure complete dependability.

Such test methods are regarded in many foundries as indispensable allies in increasing yield, not as means of scrapping castings. When foundries universally adapt these tools to control purposes, there will be practically no customer specifications calling for their application as acceptance tests.

Instrumentation as a substitute for manpower in non-destructive testing has not been extensively exploited in the castings industry. In some cases 100 per cent inspection may be desired. In the case of thin-walled gray iron castings, a conveyorized fluorescent magnetic particle inspection installation will frequently reduce cost of inspection more than half in comparison to a visual or percussion test.

On some critical steel castings, it may be desirable to locate and repair defectives before heat treatment. In one such case a special piece of equipment released four men for other duties while at the same time increasing output by 60 per cent over previous methods. The investment was returned in six months.

Automation in the foundry is on the increase, but there are few non-destructive test installations in casting plants that have kept pace with modern molding and sand handling practices.

Condensed from "Increased Foundry Profits Through Non-destructive Testing" by Kermit Skeie, Magnaflux Corp., Chicago.

Improves Production Methods

■ Non-destructive testing equipment at Scullin Steel Co. is used to obtain quantitative information about steel casting quality which is then used to evaluate factors that might be responsible for deviations from a desired soundness level.

Only one facet of casting quality will be considered here—soundness or homogeneity (presence or absence of such defects as porosity, shrinkage, cracks, etc.). The level of desired soundness is one agreed upon by the foundry and the customer, or one which through experience and design studies is found satisfactory for a particular casting in service.

The company pours basic open hearth castings varying in finished weight from less than a pound to about 35,000 lb. Non-destructive testing equipment consists of 250 kv and 1000 kv x-ray units (Fig. 2) and a portable magnetic particle inspection unit and a powder blower (Fig. 3).

As an example of how this equipment is used, consider an L-shaped plate casting 3 in. thick, weighing approximately 3500 lb. It was necessary to mold this with a large, flat section in the cope. Initial, routine radiographic inspection showed that varying amounts of porosity existed in this area. The pilot casting had not shown these defects. However, since several machined areas were involved, radiographic examination of each casting was begun.

To study the difficulty, standard test plates and production castings poured from each heat were x-rayed. Test plates approximately 1 x 5 x 6-in. cast in core sand molds, with riser and gate on opposite edges, have been found to be extremely sensitive to the formation of pinhole porosity.

A set of ten x-ray standards were set up showing variations from the best (Standard I) to the worst (Standard X) porosity conditions found in the test plates (Fig 4). Heats were then rated relative to standard porosity observed in the test plate. Production castings of test plate heats were x-rayed and rated as showing little, moderate, or excessive porosity.

When test plates of a particular heat met Standard X, production castings of the same heat showed excessive porosity. When the test

◆ **Fig. 2 . . .** Steel foundry uses 250 and 1000 kv x-ray units and a portable magnetic particle inspection unit (Fig. 3) for testing casting soundness. ◆

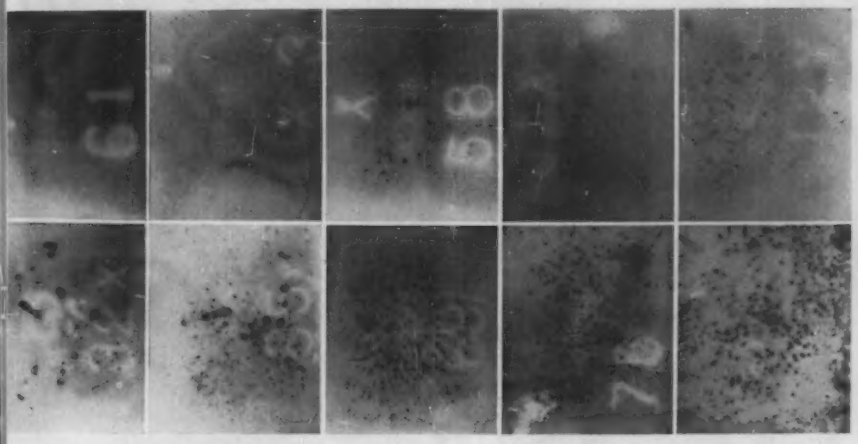


Fig. 4 . . Ten x-ray standards were established to evaluate porosity in a 3500-lb casting. The best condition is shown at the upper left and is called Standard I; the lower right condition is the worst (Standard X).

plate met Standard I, very little, if any, porosity was found.

Once a numerical rating had been applied to this type of casting soundness, it was just a question of looking for the factors responsible for quality variations. It was discovered that iron oxide content of the tap slag correlated significantly with casting soundness. Figure 5 is a plot of the average slag iron oxide content for each standard of porosity as found in a large number of test plates. The range of iron oxide contents for various heats was found to be from 8.0 to 17.5 per cent. It will be noted that as iron oxide content of the tap slag increases, the amount of pinhole porosity in the test plate increases also.

By aiming for the lower iron oxide contents in the open hearth, with all other factors remaining approximately the same, it was possible to keep plate castings within quality requirements. This isn't meant to imply that all pinhole porosity can be traced back to melt conditions; there are many complex and interacting variables in the foundry.

A turret weighing about 15,000 lb. with an average thickness of about 4 in. had localized centerline shrinkage that varied in size from casting to casting even though molding procedure remained the same. All castings were x-rayed in the area in question and given an arbitrary soundness rating from 0 to 4 depending upon the severity of the defect. When sufficient data had been accumulated, correlation with likely foundry variables was attempted. Figure 6 shows the shrinkage defect to be directly related to tapping temperature.

Because all areas of the turret to be machined must be free of crack and tear defects, more than 15 machined areas as well as other critical non-machined areas are carefully inspected by magnetic particle methods soon after the casting is normalized (Fig. 7). Significant defects are marked for removal. The areas are checked by magnetic particle inspection during defect removal and again after welding to be sure that repair is satisfactory.

Accurate daily records are kept of the number and location of crack-like defects. Figure 8 illustrates work sheets used with magnetic particle inspection of turret castings. Data are logged, then used to prepare statistical quality control charts. Each point on the control chart represents the number of crack-like defects found in a particular casting. Upper and lower control limits based upon a lot of 20 castings form the probable boundaries within which all points should fall. Charts are kept for each machined area as well as for the casting as a whole.

Calculations involved in construction of quality control charts are not particularly difficult. The charts are extremely useful for early detection of variations from normal production quality. They also show the results of improved production techniques.

Non-destructive testing by x-ray and magnetic particle inspection methods are used to maintain a high level of casting soundness by quickly spotting and locating assignable causes for downward variations from desired quality level, and to check on improved molding techniques aimed at raising the quality level.

Condensed from "Improving Casting Quality Through Non-Destructive Testing" by Francis H. Hohn, metallurgist, Scullin Steel Co., St. Louis.

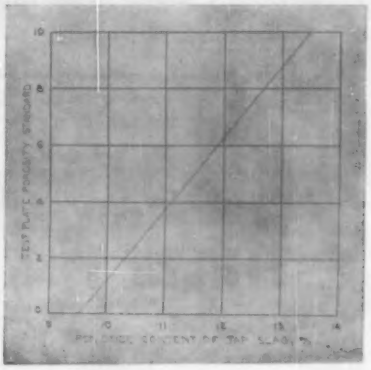


Fig. 5 . . Porosity and slag FeO related. (Fig. 6) Shrinkage was found to relate directly to tapping temperature.

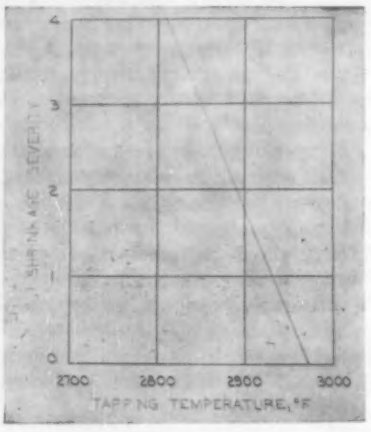


Fig. 7 . . 15 selected areas are inspected by magnetic particle methods.

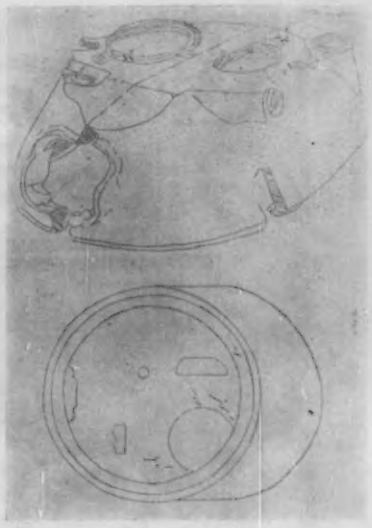


Fig. 8 . . Number and location of crack-like defects are kept on illustrated data sheets used with magnetic particle inspection.

Helps Design Better Castings

■ Every major mechanical achievement of the past decade, it is probably safe to say, has depended in some way upon experimental stress analysis for its success. Foundrymen are beginning to use it in working out casting designs with customers.

Experimental stress analysis, used with other methods of nondestructive testing, can improve casting quality to the point where the castings industry is second to none of its competitors.

Formally speaking, experimental stress analysis is devoted to the study of stresses (generally due to external loads) in bodies or structures.

Stress can be accurately figured only in simple shapes such as bars loaded in compression, tension bending, and torsion. Since castings are by nature complex shapes, stresses in such nonuniform bodies would be impossible to figure mathematically.

Most important tools of experimental stress analysis are: 1) brittle lacquer, 2) SR-4 bonded wire strain gages, and 3) photoelasticity. The first two techniques are the ones we use in our work to take direct measurements of strain on the surface of the working part. From these strain measurements the stresses are calculated directly by multiplication of the strain by the material's modulus of elasticity.

In photoelastic stress analysis, a model of the part is made from one of several transparent materials. The stresses in this material are shown as alternate light and dark bands which appear when the model is loaded in a field of polarized light.

Now here's how foundries can and are using these tools to improve their products. The people using this method find that experimental stress analysis can be a practical and effective approach to designing castings for critical applications.

It may be thought that such a program would be far too expensive to set up in a plant. Actually, the equipment for doing this work can be as simple or elaborate as desired. The lowest priced brittle lacquer kit will provide sufficient equipment to start a design program. It is possible, on the other extreme, to obtain very accurate and costly strain gage equipment for use in measuring strains in members under dynamic or actual field loadings.

For our purpose we chose to be-

gin with a rather inexpensive but effective setup (Fig. 9). Equipment consists mainly of a brittle lacquer outfit (about $700), a portable strain indicator (about $450), and assorted portable power rams and fixtures (around $350).

Since no other space was available, two rather small rooms were added to the research laboratory to be used as preparation and testing rooms. The personnel of the design department presently consists of only the author and a laboratory assistant who serves as draftsman, helps make the testing jigs and prepares the samples for testing.

The design procedure uses a minimum of mathematical calculation since the mathematically determined stress, if possible to estimate at all in these complex shapes, is not accurate enough to use as a design guide. By using brittle lacquer in conjunction with SR-4 strain gages, however, these strains or stresses are accurately and readily determined when the casting is placed under loads simulating field conditions.

With this design tool we are able to give the customer a better casting, or convert his weldments or forgings (in most cases) to properly designed castings at a substantial saving. Proper stress balance often gives the customer a lighter casting of the same strength by removing excess metal in low-stressed areas, or it can increase the casting's strength greatly by proper distribution of the metal and still not increase the weight. The customer will also benefit by our consideration of design for best foundry practice, thus giving him minimum scrap and maximum yield in production.

The foundry, in turn, benefits from the proper design because, during the development, all concerned with the future production of this casting are involved in making the samples. This gives everyone an opportunity to make helpful and cost-saving suggestions concerning his particular job on the casting while it is still in the design stage. The end result is a properly designed casting incorporating both uniform stress balance and ease of casting.

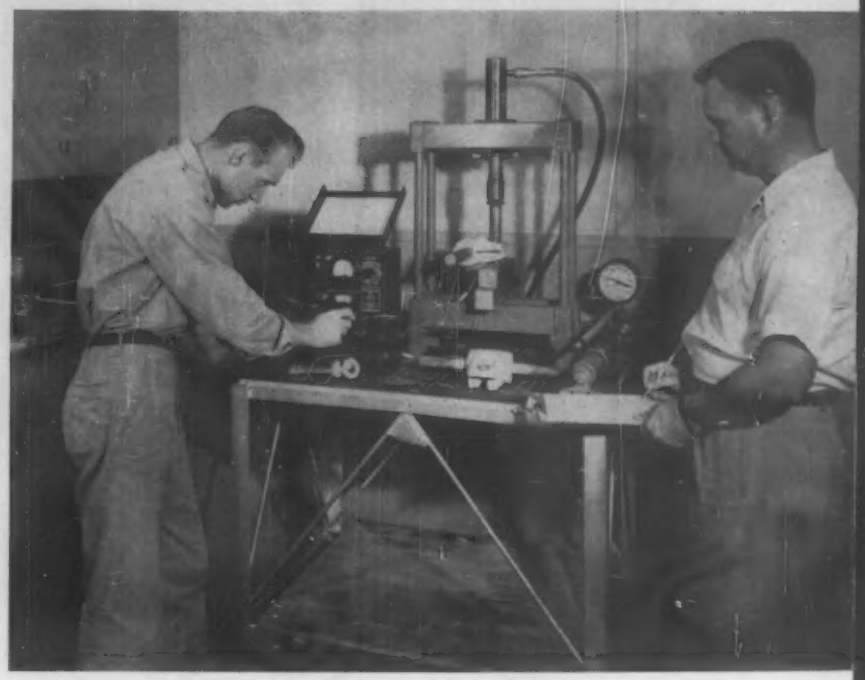


Fig. 9 . . Inexpensive but effective stress lab has a brittle lacquer outfit, a portable strain indicator, and assorted power rams and fixtures.

Proper design calls for elimination of ribs, sharp corners, and uneven sections in favor of smooth, flowing lines and gradual blending of lighter sections into heavy ones when they are necessary. This is a great help in production of a good, solid casting.

The first step in any redesign project is to get sufficient pertinent information from the customer concerning his problem to enable us to evaluate his present design and make a proposal for improvement. By going through a check list with the customer, the salesman will get the information needed in the plant without added follow-up by the design department.

After this information is compiled the salesman and design department consider a number of points before further work is done. First, why should this part be cast? This is easily answered, especially if the part is of a complex shape. In converting weldments, especially, the increased dimensional stability, freedom from internal stresses, and improved appearance of a casting should be considered.

Next we consider if the quantity involved will justify the cost of proper pattern equipment and development. This is most important when dealing with a small company whose production is low and shows little indication of increasing. Many of these shops start out with a cutting torch, a welding machine, and an idea but have not reached the point either in volume of business or stability of overall design of product to warrant the original cost of going to castings. Of course, there are many times when these small shops will turn into profitable accounts.

Another thing we need to know at this point is whether we have time to run the part through the regular design procedure. This is something that must be discussed thoroughly with the customer. In many cases the customer, who is in a great hurry to get his design cast and out of the foundry, has to be made to realize that testing with

Fig. 10 . . Brittle coat is sprayed on cleaned and undercoated specimen.

stress analysis equipment and using the resulting data to prove a design will often eliminate much time-consuming and costly field testing. Here we stress to the customer that our procedure also works out the production difficulties on the casting while the design is being developed to best meet his requirements.

Many times we find it necessary to submit drawings and estimates to a customer before we get an opportunity to properly design the casting by stress analysis methods. This does, nevertheless, give us a chance to incorporate as many ideas as possible in the design to make it easier to cast, as well as eliminate any glaring high-stress areas that might be present. This, in itself, is only second best, but is much better than trying to cast some designs that are submitted by engineers or designers who have no working knowledge of what can or cannot be readily made into a casting.

Finally, the two most important questions are:

Do we think we can reduce the weight of the part and maintain the same strength, or maintain the same weight and increase the strength?

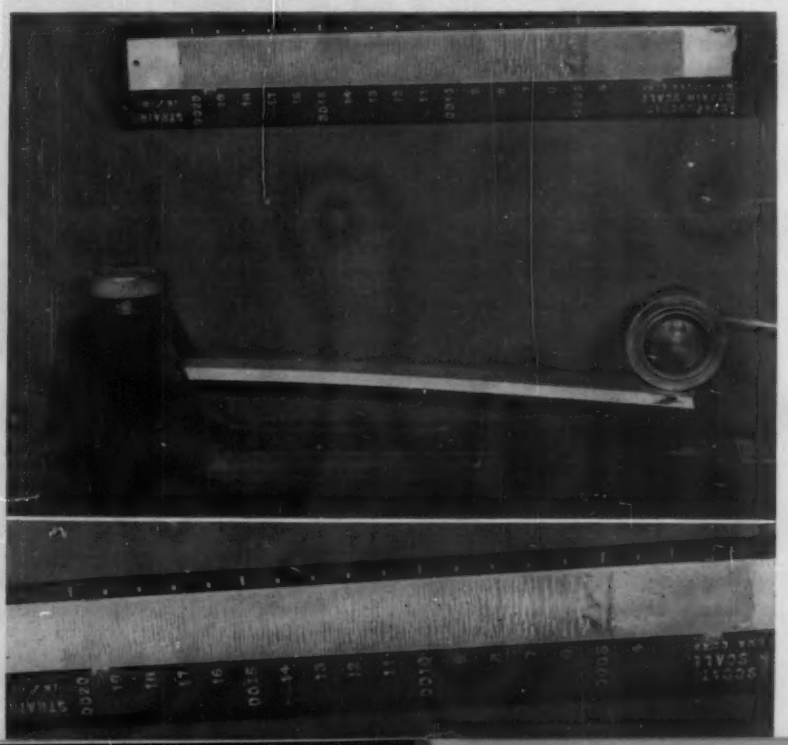
Do we think it is possible to make a casting for the same price or less than the casting, forging, or weldment that the customer has been using? If we think it is possible to answer both in the afirmative, we have something to work on.

When we have answered all these questions to our satisfaction it is time to take the technical information obtained by the salesman and proceed with the design.

To redesign something for the customer by using experimental stress analysis, we obtain one of the parts he is presently using, whether it is a casting, weldment, or forging, and run it through a brittle lacquer test. To do this we thoroughly clean the part, then coat it with an aluminum-pigmented undercoating to furnish a uniform, bright working background. Brittle coating is then sprayed over the undercoating and allowed to dry overnight at a temperature of 95 to 100 degrees (Fig. 10).

When coating the part to be tested with brittle lacquer, several calibration strips are also coated. These are placed near the part under test and indicate the coating's sensitivity as the temperature is lowered in the testing room. This sensitivity is measured by putting

Fig. 11 . . Scale indicates strain at which brittle coat will fracture.



the strip in a testing jig called a calibrator which applies a known strain. The strain scale in which the strip is placed shows how much strain is required to start fracturing the coating. Quantitative accuracy is possible only at the one strain value where fracture patterns start to form (Fig. 11).

Brittle lacquer, like glass, cracks whenever the tension stress gets above a certain amount. The cracks run at right angles to the heaviest tension stress. There is a direct correlation between the pattern formed in the brittle coating and the likelihood of a fatigue failure in a metal part because brittle materials like glass will fail in a single application of load in the same manner that a ductile material like malleable iron will fail after millions of cycles of load.

Under a single static loading, brittle-coat patterns will show where fatigue failure may occur under a great many cycles of load on the actual part. The brittle coatings can also be used under dynamic loading conditions but it simplifies the test program to be able to get results in a single application of load. The brittle coating method also provides an overall survey of stress distribution, thereby, showing where and in what direction to place strain gages. Disadvantages of the brittle coatings are that they can be used only once and are sensitive to temperature and humidity.

With this information showing the weak points in the present design, we can now undertake the job of making a better design (Fig. 12). Since we have a very good picture of stresses throughout the tested part, we know where metal should be added or taken off to give a well balanced design.

First, to give some freedom in designing, we make rough sketches of what we plan to do. From these, we make models or mock-ups of wood, clay, and plastic. At times, we can even take a sample of the present design and alter it with the above materials to give us what we want. By working on these designs in three dimensions we are able to incorporate elliptical fillets,

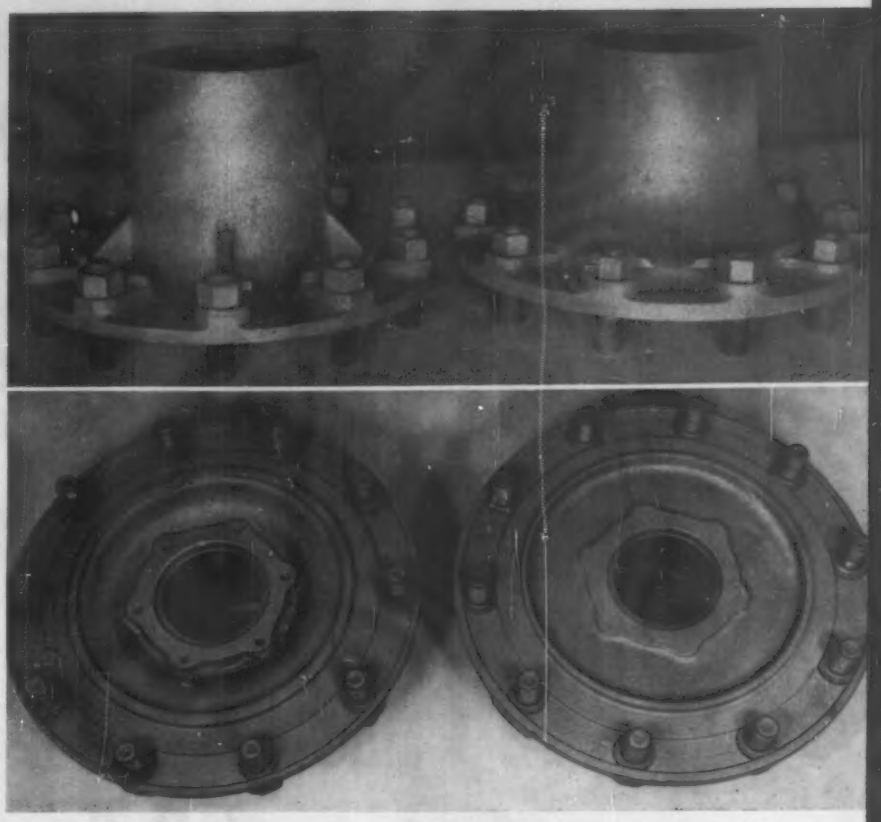


Fig. 12 . . Determination of stresses in hub casting showed where shape could be altered to improve design with sweeping lines and flat surfaces.

internal gating, blended sections and other sweeping lines that are very hard to visualize in a two-dimensional drawing on the board.

Foundry and pattern shop superintendents are next to look at the design and make any suggestions they might have to improve it for ease of casting. Many times we want to take the models and sketches to the customer to show him our ideas and to let him actually see and hold the proposed part. This makes considerable difference to many who have a hard time visualizing a design on paper. At this time, we also like to make a drawing of the proposed design with enough information shown to make a round estimate of price, and to enable the patternmaker to make a loose wood pattern for our samples.

The design department has a few basic pieces of woodworking equipment which enable us to make some of the more simple wood patterns. This eliminates the necessity for the drawing previously needed for patternmaking. The pattern in most cases can be used as both a model and a master. By making these patterns from rough sketches, we are also free to do all the things previously mentioned in modelmaking, much of which is nearly impossible to show on drawings. This consequently will eliminate the time previously spent in follow-up with the patternmaker. Also, at this stage the design for proper gating and coring can be developed.

After everyone concerned has checked the model and sketches proposed for the new design, we can make the pattern, if not already made, and cast samples.

Castings often can be made from the wooden master if the double shrinkage does not have much affect on the final casting dimensions.

When the castings are made they are followed closely by each person concerned in his department to consider possible improvements of the design for easier production.

After cleaning, grinding, and checking for defects, the samples are machined and assembled for testing. The same procedure of testing as previously described is used, and the redesigned parts are evaluated for proper design balance.

If it is found that the castings are still stressed considerably higher in one section than in others, we make changes on the master pattern and go through the same procedure again. As a person works with this method of design, he becomes more and more efficient in predicting and avoiding these areas of high stress.

When we are satisfied that the casting has the stresses evenly enough balanced throughout, a drawing is made of the final and proven design. This along with the test reports, and usually a sample casting, are sent to the customer for his final approval. When approval is received the job is turned over to the foundry for making the production pattern and castings to a design they have already found satisfactory.

Condensed from "Use of Experimental Stress Analysis as a Casting Design Tool" by Joe W. Beckham, design engineer, Texas Foundries, Inc., Lufkin, Texas.

Increased Value for Customers' Dollars

■ No testing procedure can make up for improper engineering design, but radiography and other forms of non-destructive testing can help the design engineer.

Assurance of internal soundness may justify a significant reduction in safety factors. This can lead to a reduction in size and weight of castings, and to lower costs. Therefore, the proper use of industrial radiography as a tool for non-destructive testing and quality control can lower production costs, increase yield, and insure reliability of products in service.

It is important to know when radiographic inspection is advisable and practical. A decision by the design engineer, the quality control engineer, and the production manager should be made to determine the requirements of each department and the practicability of using this form of testing.

After establishing a basic pilot casting technique, changes in procedure may be made, one step at a time, until satisfactory castings result. Radiography shows the foundryman the degree of improvement brought about by each change.

Superior quality is always the best basis on which to make repeat sales. A product may sell once if its price is low, but a high rejection rate with inferior castings would prompt the purchaser to seek a foundry consistently providing high quality castings. No one can afford to forget that in today's market there is no profitable substitute for quality.

A radiograph is a photographic record produced by the passage of x-rays, or gamma rays, through an object onto a film. When film is exposed to x-rays, gamma rays, or light, an invisible change is produced in the film emulsion. The areas so exposed become dark when the film is immersed in a developing solution, the amount of darkening depending upon the degree of exposure.

For example, take a steel casting in which there is a void formed by a trapped gas bubble. More radiation will pass through the section containing the flaw than through the surrounding area because of reduced steel thickness. A dark spot, corresponding to the projected position of the void, will appear on the film when it is developed. Thus, a radiograph is a kind of shadow picture record—the darker regions on the film representing the more penetrable parts of the object and the lighter regions the more opaque.

Case histories which follow illustrate some of the many examples of improving casting quality through radiography.

Case 1. Figure 13 shows a reciprocating ram—on the right, as cast; on the left, as it appears after extensive machining. The rough casting cost $2.00. However, to achieve the final hand-scraped finish, $375.00 in machining costs were invested. Therefore, it was important to know in advance of machining that this casting was internally sound. All of the castings machined were first approved by 100 per cent x-ray inspection.

Case 2 is a draft gear used in car coupler mechanisms for the railway industry. It is essential that this part be sound to eliminate premature failure or cause expensive breakdowns. By using radiography, a suitable foundry technique was developed with minimum delay.

Figure 14 shows the radiographic setup used for examining this 2¼-in. steel casting. Figure 15 shows the radiograph of the casting made by the "old" method and reveals considerable shrinkage. A radiograph of the casting made by the "new" method and shows completely sound material.

Case 3 is an excellent example of how radiography helped to determine the proper casting technique. This part is a cylinder which must withstand high pressures. To provide a continuous snug fit for a reciprocating piston, the inner wall requires precision machining.

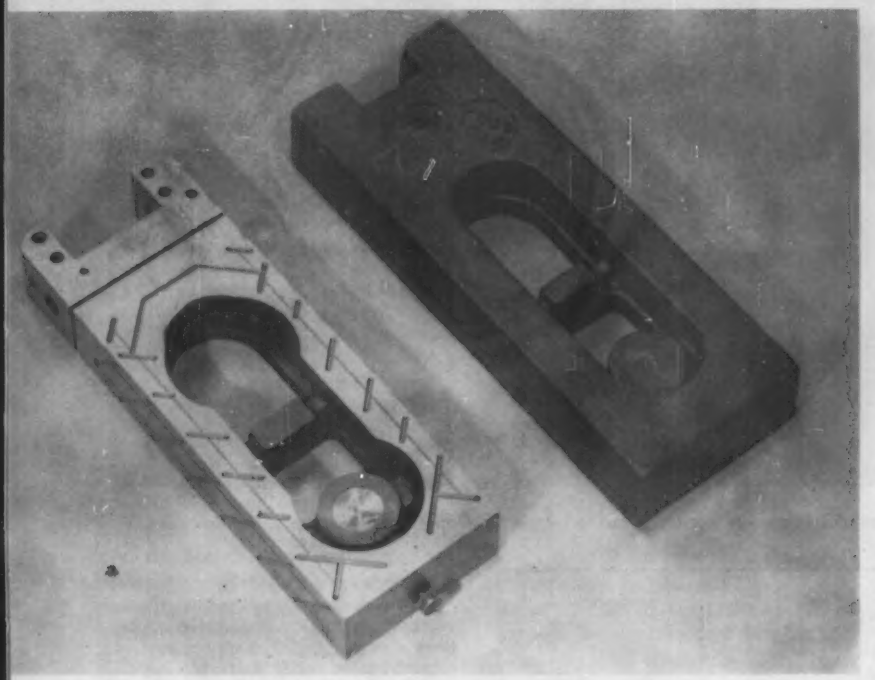


Fig. 13 . . It cost $375 to machine and finish 100% x-rayed, $2 casting.

Figure 16 shows the three critical areas of the cylinder and the radiographic views, *A*, *B*, and *C*, required to insure their internal soundness. No casting defects occurred in the cylinder head, as shown in radiographic views *C*, with any of the casting techniques employed.

The first method of risering the casting had two large feeder heads at the top of the casting and four smaller bumper risers spaced at 90° intervals around the bottom flange. The metal was gated into these small risers. The radiograph taken at position *B* on the casting made with this first method of risering showed severe shrinkage.

With casting method 2 the top risers remained the same, but the top half of the casting was padded around its external circumference. A band of zirconite sand was placed all around the mold to act as a chill for about 7 in. below the padding. The four bottom risers were increased in height to 9½ in., and increased in diameter to 5½ in. The casting was also padded on the bottom a few inches from the opening riser. The radiograph at position *A* of the casting made by this second method of risering showed considerable shrinkage.

A third method was tried. The diameter and height of the top heads were increased to 10 x 10 in. The previous top padding was increased in thickness all around. The height of the four bottom risers was increased to 14½ in. A radiograph of the casting made by this third method was taken at position *B*. The casting, in this view, was now very nearly sound.

A fourth and final method was devised. This method incorporated the same technique as No. 3 except that a band of metal chills was placed in the core opposite the zirconite sand in the mold. The core chills supplemented the chilling action of the zirconite sand in the mold which alone had been inadequate in this central section. A radiograph of the casting taken at position *B* showed internal soundness.

As a foundry's reputation for always supplying sound castings grows, the demand for these superior products should grow in equal measure. It is not an accident that consistently good castings so often come from foundries which employ radiography. Increased sales may result directly from assured quality products, but there are other tangible benefits from radiography which directly or indirectly profit both the foundry and its customers. Such benefits include:

1) Economies within the foundry resulting from increased yield of salable castings from each pound of metal poured.

2) Shorter delivery time promises which can be anticipated because radiography enables sound casting techniques to be developed with a minimum of pilot casting trials.

3) Assurance of internal soundness permits original casting design to include minimum safety factors which so often

Fig. 14 . . Radiographic setup.

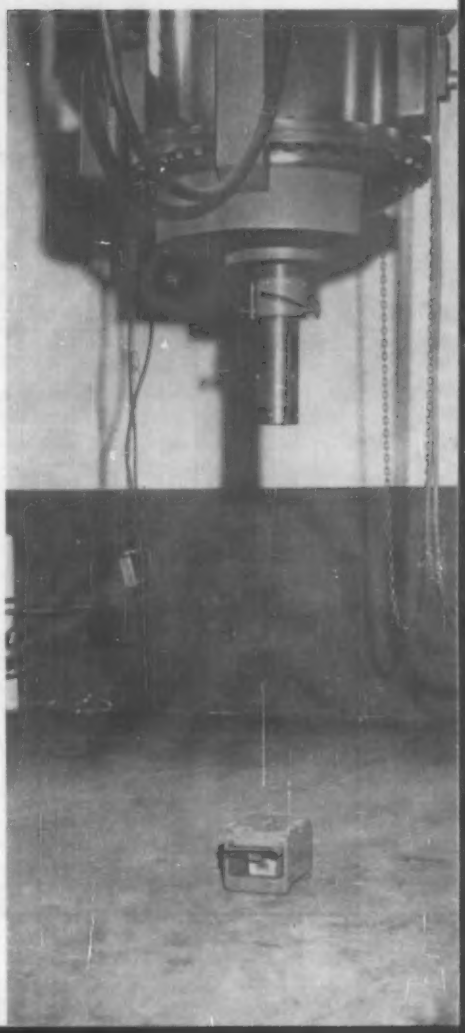


Fig. 15 . . Radiograph shows considerable shrinkage in casting made by the "old" method; "new" one is entirely sound.

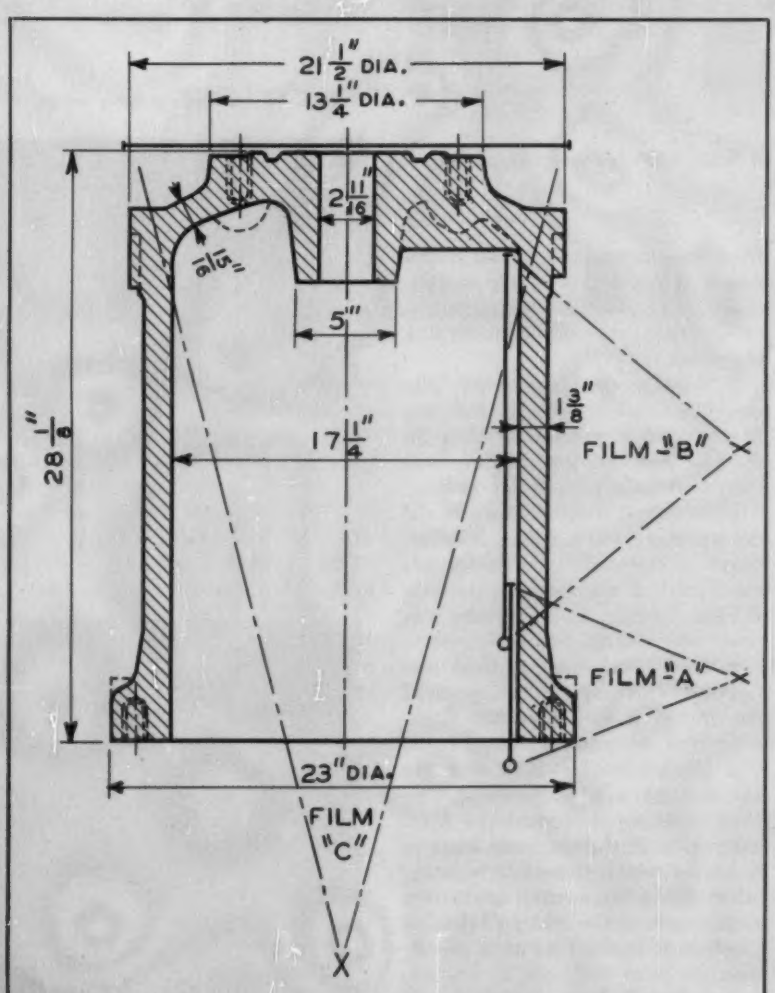


Fig. 16 . . Critical areas and views of a high-pressure cylinder casting.

are factors of ignorance.

4) Broader sales opportunities through use of high quality castings in applications now employing components fabricated by more costly methods.

5) Customers' good will for production economies made possible by higher quality castings. Savings come from:

a) Prompt foundry deliveries.
b) Anticipated low rejection rate.
c) Less need for incoming parts inspection.
d) Negligible loss of man hours and machine hours invested in parts destined for the scrap heap because of internal defects not revealed until final machining.
e) Elimination of production schedule interruptions previously thought unavoidable because of occasional lots of bad castings. While avoidance of such delays is important to foundry customers, it is vitally important that the foundry not have to interrupt its scheduled operations in order to recast (at a loss) a rush order for replacement castings.

6) Although the use of radiography may not always bring about an actual lowering of the price paid for castings, it can almost always provide increased value for the casting purchasers' dollars.

Acknowledgements. Case histories from Dow Chemical Co., General Metals Corp., and National Malleable & Steel Castings Co. are included in this report. To them the author expresses his appreciation.

Condensed from "Radiography—a Non-Destructive Test for the Foundry" by William D. Kiehle, Eastman Kodak Co., Rochester, N. Y.

Getting Good Results Consistently

■ Main requirement in obtaining high quality radiographs is to get the best possible sensitivity, the ratio of minimum detectable thickness to total thickness. To achieve this, five basic aspects of radiography—penetrameters, film density, thickness of lead intensifying screens, geometric unsharpness, tube voltage—have been carefully investigated at the Naval Research Establishment-Dockyard Laboratory, HMC Dockyard, Halifax, Canada.

The laboratory, responsible for all non-destructive testing in the RCN Atlantic Command, uses portable x-ray sets of 175 and 250-kv capacity and a 330 mc cobalt 60 source.

Penetrameters. Step and flat type penetrameters were compared as criteria for radiographic sensitivity. A series of radiographs was made with steel penetrameters of both types on top of the steel specimen and between the specimen and the film. Steel thickness was varied from ¼ to 1½ in. All other factors were kept constant except exposure time which was varied to obtain uniform density, therefore constant film contrast.

Neither penetrameter proved ideal and the step penetrameter is not as accurate as the flat type according to the data collected. Placing the penetrameter on the source side of the specimen makes the test more critical. However, for a thickness of 0.5 in. or less the penetrameter may be placed on whichever side is most convenient.

Film density. To determine the limits of film density for the greatest film contrast, a series of exposures was made of a 3/8-in. butt weld at 150 kv and 8 ma. Exposure time was varied from 15 sec to 8 min and the film densities of the parent plate and the thicker weld area were measured.

Best practical values of film density for optimum sensitivity were found to be between 2.5 and 3.0.

Lead screens. A ½-in. steel plate was radiographed on a high speed, high contrast industrial film, using 150 kv and 4 ma, and a 2 min exposure time. Source to film distance was constant but screens were varied from no lead to 0.020 in. in various combinations. Specimen and film were "backed" by air to minimize back scatter from external sources. A 0.005-in. flat penetrameter was used.

For medium and high energy radiography the preferred lead thicknesses turned out to be 0.005 in. and 0.015 in. for front and back screens respectively. Film density is not appreciably increased by the back screen but the latter is advantageous in absorbing external back scatter.

Geometric unsharpness. Effective focal spot area of the x-ray tube was determined by placing a sheet of lead 0.080 in. thick with a 1/16-in. diameter hole in the center midway between the target and the film. Focal spot image on the film was corrected for the finite size of the pinhole.

Maximum allowable geometric unsharpness was chosen as 0.005 in. Applying the unsharpness formula it was found that a minimum source to film distance of 14 in. was required for a 0.5-in. plate. Minimum source to film distance can be calculated for any focal spot diameter, test object thickness, and unsharpness.

Tube kilovoltage control. Upper and lower limits for tube voltage are necessary for any given specimen thickness and material density to keep exposure times low (use highest possible kilovoltage) while achieving the desired sensitivity (falls off if voltage is too high for thickness of specimen).

A table of exposure times for various source to film distances at specific tube voltages for various thicknesses of brass, steel, aluminum, and magnesium was set up using the technique briefed below. Anyone can use the technique but the values we obtained apply only to the specific equipment and practice used in the Dockyard Lab.

As a starting point, the source to film distance was chosen at 30 in. and exposure time at 4 min. Four step wedges were made up in 1/8-in. steps up to 2 in. for brass, and up to 3 in. for steel, aluminum, and magnesium. The wedges were then radiographed at varying kilovoltages using the previously selected 30 in. SFD and exposure time of 4 min for steel and brass and 2 min for the light metals.

Densitometer readings of each step were plotted against thickness of material for each kv value. At the constant film density of 2.5, tube kilovoltage was then plotted against material thickness (Fig. 18). From this graph the kilovoltage to be applied across the tube can easily be determined for any thickness of the four metals.

After the tube has been positioned and the source to film distance (D_1) measured, the exposure time (t_1) can be calculated by letting D_2 equal 30 in. and t_2 equal 4 min for steel and brass (2 min for aluminum and magnesium) in the equation:

$$\frac{t_1}{t_2} = \frac{(D_1)^2}{(D_2)^2}$$

Condensed from "Practical Methods for Attaining Constant Sensitivity and Density in Industrial Radiography" by K. G. Roberts, Naval Research Establishment-Dockyard Laboratory, HMC Dockyard, Halifax, N. S.

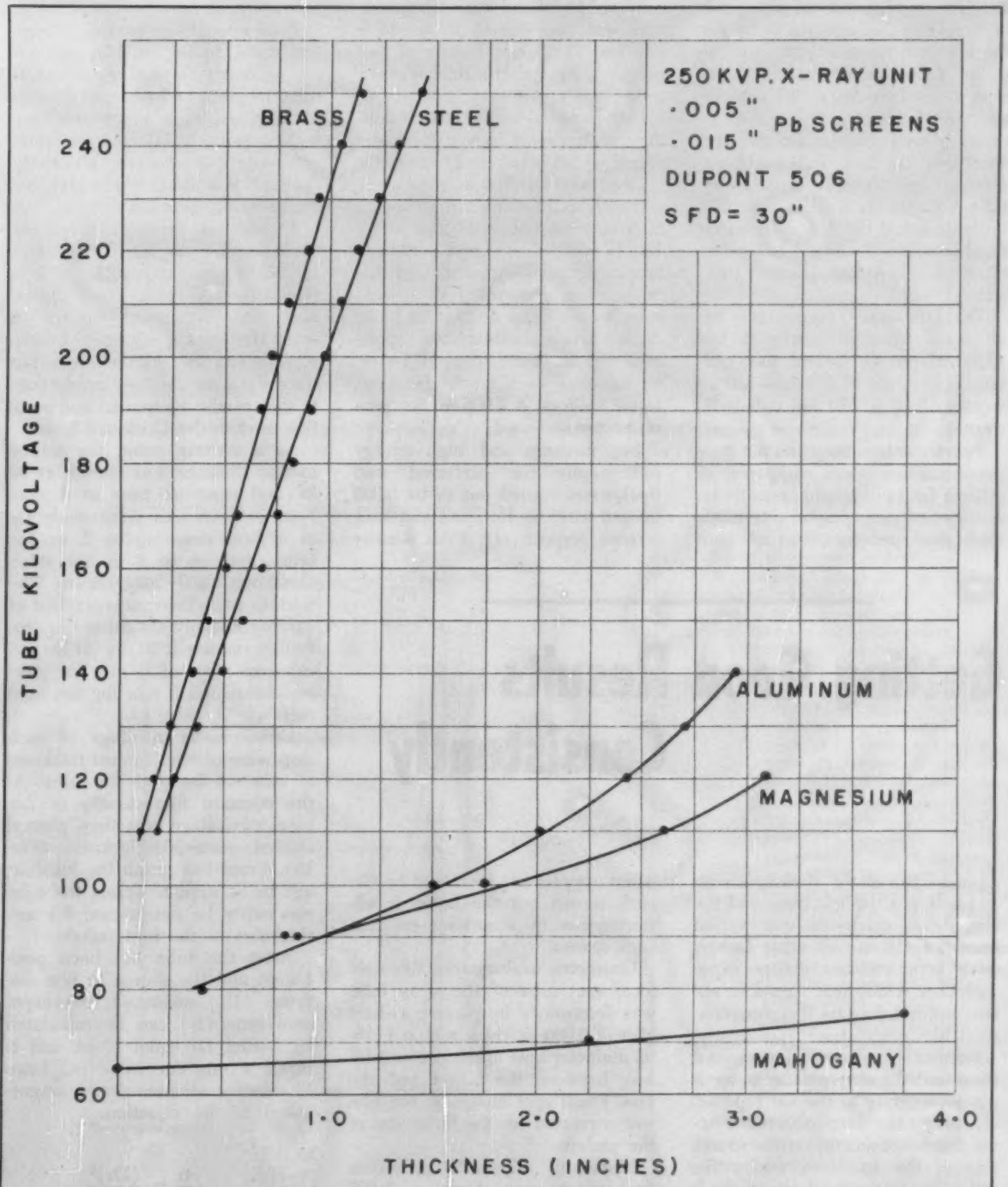


Fig. 17 . . X-ray tube voltage plotted against material thickness for a constant film density of 2.5 is applicable only to the particular 250 kvp x-ray unit with radiographs taken on high contrast, high speed industrial x-ray film, with respectively 0.005 in. and 0.015 in. lead front and back intensifying screens. Other films require corrections to the exposure time. A separate set of results will probably be necessary for other x-ray sets, lead or calcium tungstate screen combinations. From the graph: increase in the slope of curves for the lighter metals demonstrates greater latitude for thin sections and greater subject contrast for thick sections.

Looking Inside Castings With Radioactive Cobalt

■ A foundry can have its own radiographic department or use the service of an industrial laboratory. One foundry set up its own department two years ago at a cost of approximately $2500. It has proved to be a quality-control measure of the greatest importance. The radiation source is cobalt 60.

Cobalt 60 is a worthy radiation source because of the small source size of high intensity. The high intensity is good for short film distances. With fine grain film it gives adequate sensitivity over a wide range of material thicknesses. One curie or under of cobalt 60 is good for shop use on castings with wall thicknesses from 1 to 4 in. Multicurie sources of cobalt 60 can be used on castings up to 12 in. in thickness.

Cobalt 60 is relatively inexpensive. One curie costs $225 plus cost of container. Suitable storage containers are available from suppliers. Cobalt 60 has little maintenance cost and can be used in locations that are inaccessible with large equipment.

Authorizations can be obtained from the Atomic Energy Commission for use of radioisotopes; cobalt 60 is probably used more than the others. AEC regulations are imposed so that each user must apply safeguards in handling isotopes.

The technician in a foundry should set up the exposures so that they will be diagnostic, and should process and read the films intelligently. He should be familiar with all factors relative to health hazards to protect all personnel as well as himself.

If it is not feasible for a foundry to have its own radiographic department, then laboratories can be used to good advantage. Laboratories have experienced personnel

Fig. 18 . . Cobalt 60 source is positioned inside casting which is wrapped with radiographic film over test areas.

who are trained in the interpretation of the resulting radiographs. Some foundries find it more advantageous to send castings that are easy to handle to the laboratory, but when they are awkward to handle the laboratory people go into the plants.

As an example, one plant had a 7000-lb drum-type casting used for high-pressure oil field service; this casting was 6 ft long, 30 in. OD with a 7-in. flange, the nominal wall thickness was 4 in. and varied to 6 in. plus, in bosses. The radiographs were made with cobalt 60 on a Saturday morning when the foundry personnel was not working.

In a little over 4 hr the pictures were made, the films were processed on the job site, and the foundryman was satisfied as to the quality of his casting.

Cobalt 60 is portable, and self-contained as far as utility requirements are concerned. Laboratories find the portability of isotopes in field work an advantage; also the flexibility which results from the small source size that can be inserted into confined locations.

It is often the opinion of the foundrymen that castings meeting hydrostatic test requirements are sound. Radiography has shown that a casting having an internal defect may pass a hydro test and then, upon re-examination, the defects are found to be elongated. This constitutes a potential failure.

A few dollars spent to control the quality of a new or continuous process often saves considerable money for the foundryman by reducing the number of rejects. Also of importance in the ever-increasing market of today is the raising of the quality produced without increasing manufacturing costs. Foundrymen are finding that it is much less expensive to radiograph sample castings than to section them for metallurgical analysis.

Condensed from "Use of Cobalt 60 for Castings" by Jewelle N. Ketchbaw, Industrial Welding & Testing Laboratory, Houston, Texas.

Two New Publications on Radiation Protection Problems

■ Everyone working with x-ray and with radioactive materials will be concerned with the discussions presented in two new handbooks published by the National Bureau of Standards. Both books are based on studies conducted by the National Committee on Radiation Protection, an NBS-sponsored group.

X-Ray Protection

■ The increasing use of high-energy x-rays in industry has presented problems in all phases of radiation protection and shielding. To establish recommended standards of safety, the National Bureau of Standards has published this handbook.

Protection of the radiation worker and the general public is the purpose of the rules set forth in the new handbook.

General rules are presented for working conditions, survey and inspection of installations, planning an x-ray installation, structural details of protection barriers, maximum permissible weekly radiation dose and changes in x-ray equipment design. Additional rules are also given for certain specific applications including the special requirements of mobile equipment.

Suggested workloads, use factors and occupancy factors included in the handbook may be used in designing or redesigning structural shielding for x-ray installations when other information is not available.

This handbook supercedes NBS Handbook 41, *Medical X-Ray Protection up to Two Million Volts*, which was prepared by the same committee in 1949.

X-ray Protection, National Bureau of Standards Handbook 60, 14 tables, 41 pages, 20 cents. Order from Government Printing Office, Washington 25, D.C.

Regulation of Radiation Exposure by Legislative Means

■ Problems of radiation in relation to possible control by state and municipal authorities are presented in this new handbook.

At this time, only two states have comprehensive regulations designed to control all forms of ionizing radiation, and a few other states are now developing such regulations. The material in this handbook provides a convenient and suitable basis for the development of uniform radiation-control regulations that can be used by states where the need for regulation may be felt. The book includes a discussion of the philosophy of radiation-protection legislation, a suggested state radiation-protection act and suggested regulations. The suggested regulations cover such problems as maximum permissible dose, storage of radioactive materials, radioactive-contamination control and disposal of radioactive wastes.

Regulation of Radiation Exposure by Legislative Means, National Bureau of Standards Handbook 61, 60 pages, 25 cents. Order from Government Printing Office, Washington 25, D.C.

Look at Your Plant as Your Neighbors Do

K. M. Smith
Foundry Eng.

Caterpillar Tractor Co., Peoria, Ill.

■ Since community relations are the summation of what a company does for the community, and what the community actually thinks of that company, it is always desirable to look at your firm through the eyes of your neighbors.

Is your plant an obvious source of smoke and fumes which might contribute to community air pollution problems? Why not find out by making an air pollution survey of your plant by following these simple steps?

Economic contribution of a foundry is often overlooked by neighbors who may feel the plant is a community nuisance.

Map Building and Property Lines

Step 1. Draw a simple map of your building and property lines and show the location of all exhaust outlets including power plant stacks, cupolas, core ovens, sand mixing systems, sand handling systems, shakeouts, dust collectors, and general exhaust fans. Locate also all overhead windows and show the direction they face. Don't fail to show the location of air heater fresh air intake points.

Step 2. The unprotected head is an excellent detecting device for falling particles. Leave your hat in the office, and some of the dirt on the neighbor's home may land on your dome.

Tour the Roof Top

Step 3. Climb up on your roofs and describe everything you see, feel, or smell that could be considered air pollution by your neighbors.

If there are material deposits of any kind on the roof, examine them, describe them, and determine their source. Are the deposits sand, coke breeze, metal oxides, or bonding materials? Varying wind directions may create a mixture of deposits, so examine first the fresh, uppermost deposit, and record wind direction at the time.

Describe the visible discharge from stacks, exhaust fans, and windows. Record the color, odor, estimated density, distance discharge can be seen or traced, and whether the discharge is smoke, solid particles, steam, water droplets, or mud.

Are discharges continuous or intermittent? If operations differ from day to night, additional observations should be made at these times. Observe where core oven exhaust fumes go. Do any fresh air intakes pick up noticeable smoke or fumes?

Walk the Property Line

Step 4. Walk around your property line and describe what you see, feel or smell that could be considered air polution by your neighbors.

Could any of the airborne deposits have come from your plant? Are surrounding roofs, windows, or stored materials unusually stained? Is there obvious passage of smoke, dust, or odors across your property line? How far do they go? Do they have recognizable sources?

Record wind velocity and direction and the temperature at the time observations are made (may be obtained from the weather bureau). If the plant is in a valley, look for evidence of temperature inversion conditions where all smoke is kept in the valley by a low lying warm air layer. When the air of a community is frequently smokey or hazy, residents suspect all stack discharges.

Because the greater height of power plant stacks creates a different dispersion pattern additional studies may be necessary.

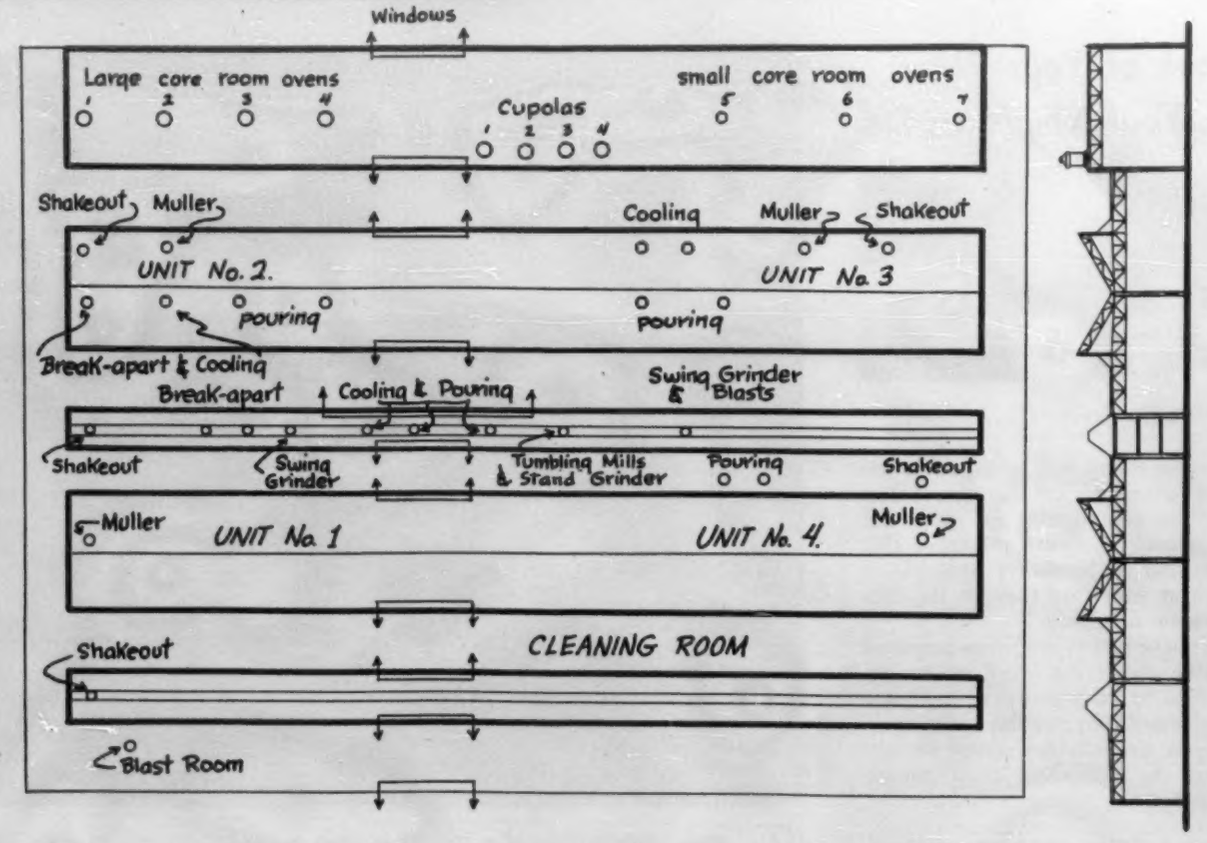
Pick Two Worst Problems

Step 5. Decide what two items you would like least if you were your own neighbor. Because the neighbors may be private homes, other factories, or retail stores, what you like the least may vary with the different sides of your property. Consideration of the problems of good community relations enters the choice of these two problems.

Tackle One Immediately

Step 6. Start immediately to do something about at least one of these problems with which you will, no doubt, be familiar and know general methods and equipment for solving.

Seek expert advice for difficult problems as a more exact air pollution survey may be required to determine acceptable emission.



Show all exhaust outlets, windows, and fresh air intakes on a sketch or engineering drawing of the foundry roof.

Brag and Start Over Again

Step 7. To enhance community relations let the public realize you are aware of their situation, that you have put yourself in their place.

Cement public opinion with newspaper stories and speeches at open houses, dedications, and civic events that point out continuing efforts and accomplishments in solving the air pollution problem.

GE Starts Castings Lab

A $750,000 laboratory to improve foundry processes and products will be established in Schenectady, N. Y., by General Electric Co.'s foundry department.

The new research lab will have a development foundry and areas for the following laboratories: physical test, chemical test, metallography, radiography and ceramics. Some 17 engineers and technicians will comprise the laboratory staff, which will serve the GE foundry operations under the supervision of Eugene R. Oeschger, general manager of the foundry department.

Dr. Jack Keverian has been appointed manager of applied research and development and will head the staff of the new laboratory. The research program under Dr. Keverian's direction will deal specifically with the problems and processes inherent in casting metal, rather than with metallurgical research.

Okay, okay, how did all this begin?

Spectroscopy Copy Due

The American Association of Spectrographers will hold their 7th annual meeting in Chicago, May 4, to confer on "New Developments and Techniques in Spectroscopy."

The group invites contributed papers in the fields of emission, x-ray fluorescence or absorption spectroscopy. Abstracts for all papers must be submitted by March 16. John P. Merutka, H. M. Harper Co., Morton Grove, Ill., is chairman of the papers committee and will accept all abstracts.

'56 Makes 24 Straight For Southeast Regional

■ The oldest continuous series of American Foundrymen's Society regional meetings will be lengthened to 24 when the Southeastern Regional Foundry Conference is held at the Tutwiler Hotel, Birmingham, Ala., February 16-17. Sponsored by the Birmingham District Chapter, Tennessee Chapter, and the University of Alabama

John F. Drenning

Student Chapter, the meeting is expected to attract over 500 men from industry.

Conference chairman is John F. Drenning, Kerchner Marshall & Co., vice-chairman of the Birmingham District Chapter. A ladies program, including a luncheon, fashion show, and reception, has been arranged under the supervision of Mrs. T. H. Benners. Included in the conference for the first time last year, the ladies program is expected to draw about 100.

THURSDAY, FEBRUARY 16

9:00 am..REGISTRATION
10:00 am.."*Shell Cores,*" Ray Olson, Shell Process, Inc.
11:00 am.."*Job Evaluation,*" Milton E. Annich, American Brake Shoe Co.
12:30 pm..LUNCHEON. Addresses by Bruce L. Simpson, president, AFS, and William W. Maloney, general manager, AFS.
2:00 pm.."*Selection and Preparation of Sands for Foundry Use,*" Earl E. Woodliff, Foundry Sand Service and Engineering Co.
3:00 pm.."*High Pressure Molding,*" T. E. Barlow, Eastern Clay Products Dept., International Minerals and Chemical Corp.
4:00 pm . . "CO_2 *Process,*" Roy J.

Carver, Carver Foundry Supply Co.

FRIDAY, FEBRUARY 17

9:00 am . . PLANT VISITATION
1:00 pm . . SECTIONAL MEETINGS
"Foundries Refractories," L. L. Gill, Harbison-Walker Refractories Co.
"How the Melting of Brasses and Bronzes Affects the Quality of Castings," Wm. M. Ball, Jr., R. Lavin & Sons, Inc.
2:00 pm . . *"Cleaning Castings,"* A. Leslie Gardner, Pangborn Corp.
3:00 pm . . SECTIONAL MEETINGS
"Upgrading of Iron," G. P. Dahm, Linde Air Products Co.
"Non-Ferrous Foundry Practice," D. L. LaVelle, Federated Metals Div., American Smelting & Refining Co.
7:00 pm . . BANQUET

Devise Shell Tensile Test

Investigation of tests for tensile, properties, resin content, and test casting conditions of shell molding materials was recently continued by the Shell Molding Materials Testing Committee 8-N at the General Motors Corp. Technical Center in Warren, Mich.

This Sand Division committee of the American Foundrymen's Society approved the tensile test described in "Foundry Facts," MODERN CASTINGS, December 1955, pages 69-70, as a tentative standard.

A test for determining the resin content of pre-coated or blended sands is to be based on the method of committee member E. J. Valyi, A.R.D. Corp., Yonkers, N. Y., combined with the Crucible Method of Analyzing for Combustibles, FOUNDRY SAND HANDBOOK, Sixth Edition, 1955, page 137.

Designs for vertical and horizontal shell mold test patterns are to be submitted by G. M. Etherington, American Brake Shoe Co., Mahwah, N. J., at the next meeting. Class 35 iron will be the standard test metal. It is hoped that thermal shock, distortion, penetration, and dimensional tolerances can be evaluated with test patterns.

A subcommittee will investigate the feasibility of writing a shell molding handbook.

Nicholas Sheptak, Dow Chemical Co., Midland, Mich., presided.

CIRCLE NO. 120, PAGE 63-64

Light Metals Program

Centrifugal casting of aluminum as well as developments in sand, die, and permanent mold casting of light metals will be dsicussed at the 1956 AFS Castings Congress at Atlantic City.

Among papers arranged by the Light Metals Division of the American Foundrymen's Society are die casting papers on: high temperature fatigue properties, sludging practice for aluminum, and aluminum die castings for machining.

Included also are: "Centrifugal Casting of Aluminum," "New Aluminum Casting Alloy XA140 for Elevated Temperature Applications," "Improved Aluminum Permanent Mold Casting Alloys XC-355 and XA356," and "Evaluation of ZH62XA Magnesium Sand Casting Alloy."

The most recent AFS sponsored work on vertical gating at Battelle Memorial Institute will be reported. Another paper will disclose the effects of test casting section size variations on the properties of some Mg-Al-Zn alloys.

Research for Profit

Industrial research—its motives, its management, and its results—will be examined at the first annual National Industrial Research conference at the Sherman hotel in Chicago April 18 and 19. The conference is sponsored by the Armour Research Foundation of Illinois Institute of Technology.

The need for a management level forum where common problems of industrial research can be discussed is pointed out by conference chairman Dr. Haldon A. Leedy, director of the Foundation who also notes the increasing importance of, and expenditures for, research and development.

With the theme "Research for Profit" the two-day conference will consist of 12 papers at three half-day sessions, two luncheon meetings, and a dinner meeting.

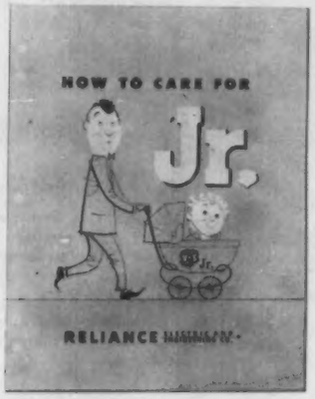
Industrial executives interested in the management of research and development may obtain further information by writing to Joseph J. Kowal, conference secretary, Armour Research Foundation of Illinois Institute of Technology, 10 W. 35th Street, Chicago 16, Ill.

for the asking

Used foundry equipment / of all makes and all types are carried in stock and listed in bulletin 156. *Euclid Foundry & Machine Equipment Co.*

CIRCLE No. 33, PAGE 63-64

Electronic variable-speed drives / 4-page bulletin "How to Care for Jr." describes and illustrates the simple, but comprehensive program to keep Reliance V°S Jr. Drives operating at peak efficiency. Preventive maintenance is related to units in operation and specific type of operations. *Reliance Electric & Engineering Co.*



CIRCLE No. 34, PAGE 63-64

Cast steel shot / blast cleaning abrasive is described in 8-page Bulletin 89-B. Automatic manufacturing processes and quality controls are discussed. Research and development facilities are described. Various types of metallic abrasives are compared. Factors of economical and efficient abrasive consumption are given. *Wheelabrator Corp.*

CIRCLE No. 35, PAGE 63-64

Air-drying spray / for green sand cores and molds, Top Bond has excellent penetration and provides a resin bonded surface which is firm and hard with clean sharp edges. 8-page Buletin TB-1 gives application procedures, discusses moisture resistant qualities, and tells how Top-Bond is the answer to several foundry problems. *United Oil Mfg. Co.*

CIRCLE No. 36, PAGE 63-64

Metal temperature / measurement and control becomes accurate and easy when Marshall Enclosed-Tip thermocouples are used. Stationary and portable units and replacement units and parts list are covered in 8-page brochure. *L. H. Marshall Co.*

CIRCLE No. 37, PAGE 63-64

Molding sand research / is reported in 16-page Bulletin 223C "Heat Penetration into Foundry Molds." Designed to stimulate further investigations, the tests reported cover many aspects of the transition from hot strength into baked strength or collapsibility. Discussed are western and southern bentonites, fire clays, molding sands, heat transfer, sintering, and compression and tensile measurements. *American Colloid Co.*

CIRCLE No. 38, PAGE 63-64

Industrial ovens / 20 standard models of heavy-duty, gas or electric, cabinet ovens for temperatures from 500 to 1000 F are described in Bulletin 3-1155. Bulletin HT-53 covers design, performance, and layouts of car-bottom, batch, conveyor, pit, and special types of heat treating furnaces and ovens. *Carl-Mayer Corp.*

CIRCLE No. 39, PAGE 63-64

Zirconium products / for increasing foundry production include Tam's highly refractory, unusually fine Zirconite sand with low thermal expansion and high thermal conductivity; Zirconite flour for mold and core washes and for reducing permeability of silica or Zirconite sand mixtures; specially prepared Zirconite mold and core washes. 16-page bulletin. *Titanium Alloy Mfg. Div.*

CIRCLE No. 40, PAGE 63-64

Vibrating conveyors / type LMV for light service is a light weight unit of 12′ sections, in widths of 5″, 8″, 12″,

18", and 24". 36-page Catalog 890 covers design features and dimensions, drive arrangements, timing control, material handling capacities based on conveyor size and material density—conveyability, accessories, and installation procedure. *Jeffrey Mfg. Co.*

CIRCLE No. 41, PAGE 63-64

Electric motors / Bulletin 1700 covers the new L.A. line of open drip-proof, enclosed, explosion-proof, and special

electric motors. Includes cut-away views, technical drawings and graph of data on performance and application features. *Louis Allis Co.*

CIRCLE No. 42, PAGE 63-64

Abrasive separators / featured in 8-page Bulletin 1003 handle from 33,000 to 320,000 lb/hr abrasive. Screening device removes coarse material, remainder is stratafied and airwashed to remove fines, sand, and inefficient, worn abrasive. *Pangborn Corp.*

CIRCLE No. 43, PAGE 63-64

Freight car switcher / described in 16-page folder T-115 is a road to rail conversion with plenty of power to handle RR siding needs also doubles as a tractor in hauling carts and wagons on road wheels. Heavy-duty Trackmobile is designed to give extra rugged service. *Whiting Corp.*

CIRCLE No. 44, PAGE 63-64

Cold setting binder process / new time and money saving method of sand core production described in 4-page technical bulletin involves Kold-Set binder, dry sand, and Kold-Set activator (catalyst) which develops green strength and controls setting-up time. Advantages, techniques, and detailed description of the process are covered. *G. E. Smith, Inc.*

CIRCLE No. 45, PAGE 63-64

Foundry alloys / Composition, purpose, and application of V-5 chromium containing alloy is given in 6-page bulletin. Additions and results of various amounts are also discussed. *Vanadium Corp. of America*

CIRCLE No. 46, PAGE 63-64

Immersion pyrometer / Catalog 155 says the dependable, accurate, rugged, durable Pyro, being a self-contained, quick acting, direct reading, 4½" indicator, is the best for temperature control of non-ferrous metals. *Pyrometer Instrument Co., Inc.*

CIRCLE No. 47, PAGE 63-64

Shell mold and core equipment / of 19 manufacturers is described in 12-page Issue 9 of Foundry Facts. Blowing machines are included in compilation of latest manufacturers' information. Some sources of auxiliary equipment, miscellaneous parts and services are also included. *General Electric.*

CIRCLE No. 48, PAGE 63-64

Heat exchanger / for recovering waste heat from high temperature gases is described in 8-page bulletin. Plate-fin exchanger, with extended surfaces on both shell and tube sides, operates on the cross-flow principle for maximum transfer of heat between gases. *Griscom-Russell Co.*

CIRCLE No. 49, PAGE 63-64

Shell molding / Shal-Tec Bulletins 302, 3, 4, 5, & 6 cover, respectively: deep draws (2" diam, 3½" deep; ⅝" diam, 1¼" deep); avoiding shell warpage; molding costs (aids for pricing); job lots (shell vs. several manufacturing methods); shell cores (procedures, materials, costs). *Shalco Engineering Corp.*

CIRCLE No. 50, PAGE 63-64

Heat treating furnaces / and atmosphere generators are described in 17 sheet catalog. Equipment is of electric and fuel fired types. *Sargeant & Wilbur, Inc.*

CIRCLE No. 51, PAGE 63-64

Repair cast iron parts / quickly and easily with Ni-Rod and Ni Rod "55" says brochure illustrating advantages of use for welders of limited experience, no preheat or post heat required in 9 out of 10 cases, special core wires and fluxes, full range of sizes. *International Nickel Co., Inc.*

CIRCLE No. 52, PAGE 63-64

Monorail engineering / Completely revised 12-page Engineering and Application Booklet 2008L describes stresses in various type track used for overhead materials handling systems. Covers track peening, data on Tramrail systems. *Cleveland Tramrail Division, Cleveland Crane & Engineering Co.*

CIRCLE No. 53, PAGE 63-64

Universal testing machines / are presented in 12-page Bulletin 4401. Baldwin-Tate-Emery hydraulic machines have capacities of 10,000 to 5,000,000 lb; include standard and special types both vertical and horizontal. *Baldwin-Lima-Hamilton Corp.*

CIRCLE No. 54, PAGE 63-64

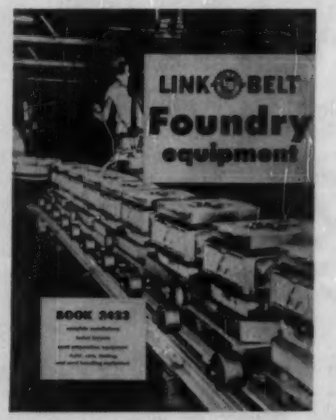
Going to basic lining? / Comprehensive discussion of problems involved (in 12-page Guide for Refractory Selection) should help you obtain higher production and greater economy in refractory practice. *Basic Refractories, Inc.*

CIRCLE No. 55, PAGE 63-64

Portable air tools / listed in 8-page bulletin include: small wheel, straight, and vertical grinders; chippers and rammers; and drills from ¼" to 2" capacity. *Rotor Tool Co.*

CIRCLE No. 56, PAGE 63-64

Foundry layouts / for two gray iron, two malleable, a brass, an aluminum, and a combination malleable and gray iron shops show sand systems in each case and melting set-up in the last. Oscillating shakeout and sand preparation installation fed by tractor-shovels



is treated separately. In addition, 42-page Book 2423 illustrates and discusses almost every piece of foundry material handling equqipment. *Link-Belt Co.*

CIRCLE No. 57, PAGE 63-64

Metallography automation / is discussed in vol 1, no. 6 of AB Metal Digest. 8-page pamphlet treats multiple

continued on page 60

Experimental Engine Block Largest Die Casting Made

■ Successful development of a die cast aluminum engine block has been accomplished by the Doehler-Jarvis Div. of National Lead Co. The six cylinder, in-line block weighs approximately 50 lb as it comes from the die casting machine and 43 lb when trimmed; the largest die casting ever made in aluminum.

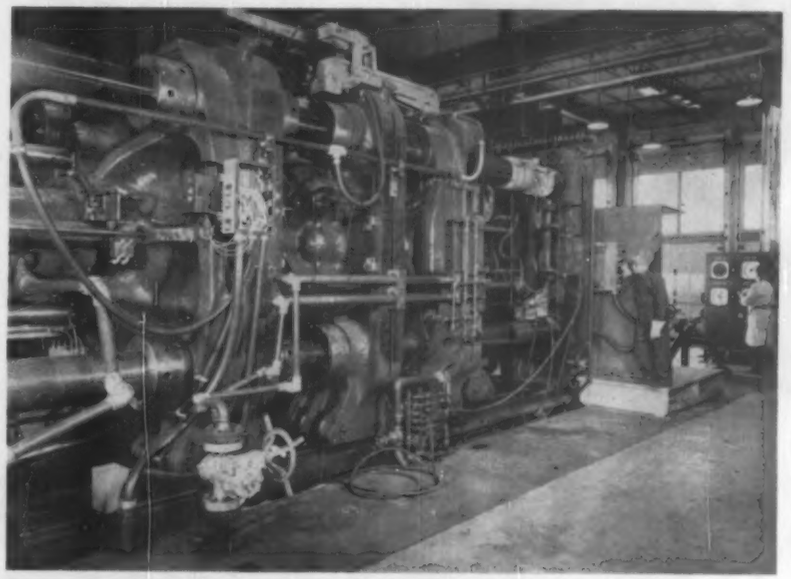
The new block has been produced on an experimental basis at a Toledo, Ohio, plant of Doehler-Jarvis on a machine that can handle dies weighing up to 50 tons. Development of the block and the machine resulted from a joint project of National Lead Co. and the Kaiser Aluminum and Chemical Corp.

The 50 lb aluminum block is the equivalent of a 175 lb gray iron block. Thus, Doehler-Jarvis states, by using aluminum rather than gray iron and by reducing the wall thickness in the aluminum block, immediate weight savings of 132 lb are realized.

The aluminum block would show an approximate 10 per cent price advantage over the conventional gray iron block, according to Doehler-Jarvis general manager Frank J. Koegler. He states that the die cast block needs far less machining than the gray iron block, because the machining is confined to the main sealing areas. Further savings are said to result from the fact that the aluminum block uses a simpler cooling system since aluminum is a better heat conductor than iron.

The new engine block can be produced at a rate of 30 to 35 pieces per hour on a single machine, according to A. F. Bauer, chief engineer of Doehler-Jarvis, who has been in charge of the development project. At this rate of production approximately 1700 lb of molten aluminum are used each hour. Bauer adds that all the 129 holes in the block are cored and cast to size.

Extensive testing of the new blocks is now under way while development of an aluminum V-8 block continues.



72-inch die casting machine producing experimental engine block.

continued from page 58

specimen preparation with equipment adaptable to present AB low speed polishing machine. *Buehler Ltd.*
CIRCLE No. 58, PAGE 63-64

Spectrographic analysis / Bulletin 42 says direct reading Spectromet provides automatic quality control from the foundry floor, determines 8 elements quantitatively, has built-in laboratory environment, and is priced for small foundry applications. Bulletin 42, *Baird Associates, Inc.*
CIRCLE No. 59, PAGE 63-64

Mudding and patching compounds / Smooth, white, plastic Sliktite is recommended for cores in steel, gray iron, malleable, and non-ferrous castings. Smooth, black, plastic Ebony for all but steel applications. Directions for mixing and applying are given. Same brochure describes Chillkoat and gives instructions for use and application. *Delta Oil Products Co.*
CIRCLE No. 60, PAGE 63-64

Vacuum valves / bellows type described in 6-page bulletin 401 are specially designed for high vacuum, have safety stop for limiting bellows compression, for threaded, flanged, or welded pipe installations. In bronze, steel, or cast iron. *Kinney Mfg. Div.*
CIRCLE No. 61, PAGE 63-64

Marketing / the eastern seaboard is discussed in 20-page booklet showing special advantages of the public merchandise warehouse and its many distribution services for protecting markets and saving costs. *Lehigh Warehouse & Transportation Co.*
CIRCLE No. 62, PAGE 63-64

Investment casting method / is described in technical reprint "Precision Casting Simplifies Production of Stainless Pump Impeller". Typical design and casting techniques are outlined and illustrated. *Eco Engineering Co.*
CIRCLE No. 63, PAGE 63-64

Lithium cartridge use / in deoxidizing and degassing copper-base alloys and for the production of sound, high-conductivity castings is described in technical reprint. Accompanying bulletin discusses the cause of porosity in castings, describes lithium metal, and its metallurgical applications. *Lithium Corp. of America, Inc.*
CIRCLE No. 64, PAGE 63-64

Truck costs / "How to Figure Your Industrial Truck Costs" is subject of 4-page folder dealing with cost of truck ownership and operation. Con-

siders gas and electricity, lubricants, hydraulic fluids, operator(s) wages, supervision, maintenance costs of pallets, skids, etc. *Elwell-Parker Electric Co.*
CIRCLE No. 65, PAGE 63-64

Industrial marking user / is aided in selecting the proper marking stick by the "Markal Paintstick Selection Chart" telling which Paintstick applies to a given situation of material and conditions. *Markal Co.*
CIRCLE No. 66, PAGE 63-64

Plastic and castable refractories / cements, and mortars are described from packaging to completed installation in ferrous and non-ferrous melting and heat treating furnaces—in 16-page catalog. *Ramtite Co.*
CIRCLE No. 67, PAGE 63-64

"How Temperatures Are Measured" / 8-page brochure defines temperature, temperature scales, effects of temperature; thermometer, pyrometer, color, and chemical change measurement of temperature. *Tempil Corp.*
CIRCLE No. 68, PAGE 63-64

Flexible exhaust hose / is described in Bulletin 50, applications of Flexaust hose and Portovent duct to grinders, abrasive cut-offs, welding machines, buffers, and ventilation. *Flexaust Co.*
CIRCLE No. 69, PAGE 63-64

Carbon source / for furnace charge or ladle recarburization of steel through using Recarb-X is told in Engineering Bulletin 11. Efficiency under various conditions is given as is how it should be added in each case. *United States Graphite Co.*
CIRCLE No. 70, PAGE 63-64

Core blowers / No. 4 and 4D are described in two brochures which indicate their wide range of work, rugged simple construction, fast operating cycle, automatic safety and interchangeable features. *Redford Iron & Equipment Co.*
CIRCLE No. 71, PAGE 63-64

Die casting machines / Lester line is described in detail in comprehensive brochure. Features and technical advantages are given. Variety of installations and typical castings are shown. Capacities for zinc and aluminum machines are listed. *Lester Phoenix, Inc.*
CIRCLE No. 72, PAGE 63-64

"Health and Employer/ee Efficiency" / is the title of 12-page guide in planning, developing, or expanding em-

---

CIRCLE No. 123, PAGE 63-64

ployee health programs. For better understanding industrial medical services and employee health care. *Occupational Health Institute.*

CIRCLE NO. 73, PAGE 63-64

Industrial radiography / Tri-Ind-X, light-weight, compact, and powerful x-ray unit, rated for continuous operation from 50 kvp through 260 kvp will deliver a full 10 ma at top voltage. 16-page bulletin provides general information, shows design features, illustrates uses, and gives specifications. *Triplett & Barton, Inc.*

CIRCLE NO. 74, PAGE 63-64

Non-ferrous castings / bronze in water supply systems, aluminum in bowling pin-setting machines, magnesium launch anodes, and lead linings for process tanks are described in 6-page Digest vol 2, no 3. *Federated Metals Div., American Smelting and Refining Co.*

CIRCLE NO. 75, PAGE 63-64

Casting design / Bibliography on casting design includes 120 references to articles appearing the past ten years in American and British publications and a couple in foreign languages. In addition nine books specifically on the subject are listed. *American Foundrymen's Society.*

CIRCLE NO. 76, PAGE 63-64

Flexible patterns / Step by step description of making flexible cope and drag multiple patterns in a new type of synthetic rubber, starting with a single loose piece split pattern. Technical paper, other technical bulletins and price lists. *Perma-Flex Mold Co.*

CIRCLE NO. 77, PAGE 63-64

pH meter / Bulletin 118 describes battery-operated pH Meter Model 125 and many recently developed accessories. Three ordinary radio batteries last 2000 hr. *Photovolt Corp.*

CIRCLE NO. 78, PAGE 63-64

Blast cleaning / Vol. 11, No. 1 *"Blast Cleaning and Dust Control News"* shows 7 applications of blast cleaning, one of blast peening, and two dust collecting setups. *Pangborn Corp.*

CIRCLE NO. 79, PAGE 63-64

Spectrographic analysis / of ductile cast iron for rapid, low cost determinations of magnesium and cerium is described in technical reprint. Data indicates accuracy and reproducibility obtainable. *National Spectrographic Laboratories, Inc.*

CIRCLE NO. 80, PAGE 63-64

Postage Will be Paid by Addressee

No Postage Stamp Necessary If Mailed in the United States

BUSINESS REPLY CARD
First Class Permit No. 83, Sec. 34.9 P. L. & R. DES PLAINES, ILL.

MODERN CASTINGS
Golf & Wolf Roads
Des Plaines, Illinois

If you aren't a member of the American Foundrymen's Society you will want to subscribe to the new MODERN CASTINGS. Simply fill out reverse side of card at left and mail it now!

Free Data?

(Complete cards below)

(Fill out card above)

To Subscribe?

WHAT DO YOU WANT?

Postage Will be Paid by Addressee

No Postage Stamp Necessary If Mailed in the United States

BUSINESS REPLY CARD
First Class Permit No. 83, Sec. 34.9 P. L. & R. DES PLAINES, ILL.

Reader Service Dept.
MODERN CASTINGS
Golf & Wolf Roads
Des Plaines, Illinois

Do you want more data, prices, or other information on the products or bulletins advertised or listed in this issue? Then fill out the postage-free reader service card. Mail it today. Our reader service department will process your requests promptly.

Please have manufacturer send me without obligation information or bulletins indicated by numbers circled.

1	2	3	4	5	6	7	8
9	10	11	12	13	14	15	16
17	18	19	20	21	22	23	24
25	26	27	28	29	30	31	32
33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48
49	50	51	52	53	54	55	56
57	58	59	60	61	62	63	64
65	66	67	68	69	70	71	72
73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88
89	90	91	92	93	94	95	96
97	98	99	100	101	102	103	104
105	106	107	108	109	110	111	112
113	114	115	116	117	118	119	120
121	122	123	124	125	126	127	128
129	130	131	132	133	134	135	136
137	138	139	140	141	142	143	144
145	146	147	148	149	150	151	152

★ Please print or type information below

56|2

NAME

TITLE

COMPANY

ADDRESS

CITY AND ZONE

If you aren't a member of the American Foundrymen's Society you will want to subscribe to the new MODERN CASTINGS. Simply fill out card at right and drop it in the mails.

YES!. . . I want to receive MODERN CASTINGS regularly. Enter my subscription for one year at $3 (U.S., Canada, Mexico); $6 elsewhere.

☐ Payment is enclosed ☐ Bill me later

Name..... Position or Title..... Important

Address ☐ Home ☐ Business .....

City..... Zone..... State.....

Company.....

WHAT DO YOU WANT?

Free Data?

(Complete cards below)

(Fill out card above)

To Subscribe?

Do you want more data, prices, or other information on the products or bulletins advertised or listed in this issue? Then fill out the postage-free reader service card. Mail it today. Our reader service department will process your requests promptly.

Please have manufacturer send me without obligation information or bulletins indicated by numbers circled.

1	2	3	4	5	6	7	8
9	10	11	12	13	14	15	16
17	18	19	20	21	22	23	24
25	26	27	28	29	30	31	32
33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48
49	50	51	52	53	54	55	56
57	58	59	60	61	62	63	64
65	66	67	68	69	70	71	72
73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88
89	90	91	92	93	94	95	96
97	98	99	100	101	102	103	104
105	106	107	108	109	110	111	112
113	114	115	116	117	118	119	120
121	122	123	124	125	126	127	128
129	130	131	132	133	134	135	136
137	138	139	140	141	142	143	144
145	146	147	148	149	150	151	152

★ Please print or type information below

56|2

NAME

TITLE

COMPANY

ADDRESS

CITY AND ZONE

Postage Will be Paid by Addressee

No Postage Stamp Necessary If Mailed in the United States

BUSINESS REPLY CARD

First Class Permit No. 83, Sec. 34.9 P. L. & R. DES PLAINES, ILL.

Reader Service Dept.
MODERN CASTINGS
Golf & Wolf Roads
Des Plaines, Illinois

foundry trade news

Texas Foundries Inc. . . poured first steel casting at new steel foundry in Lufkin on November 29. New facility is part of $1,000,000 expansion program. Plant includes equipment for heat treat and for inspection with gamma ray projectors.

Bay City Electric Steel Casting Co. . . has been sold to J. A. MacKinnon, F. C. Mueller and W. B. Ward, all of Bay City, Mich. Operation of jobbing foundry will continue as usual.

Ruegg Foundry . . Los Angeles plant has joined Non-Ferrous Founders' Society.

Crouse-Hinds Co. of Canada . . has completed first building in an expansion program. Present plant occupies 85,000 sq ft including ferrous and non-ferrous foundries. New building adds 48,000 sq ft of assembly and warehousing space.

Southington Foundry Inc. . . has increased production capacity 100 per cent. Jobbing shop has facilities to produce gray iron or non-ferrous castings to 6000 lb.

American Brake Shoe Co. . . will join with F. H. Lloyd & Co., Ltd., of England to produce ferrous castings for jet planes and tire molds in the United Kingdom. Plant operations will begin late this year.

Whiting Corp. . . has formed new export division to handle overseas sales. **Whiting International** will headquarter in New York.

Rockwell Mfg. Co. . . will renovate foundry and expand machine shop at Barberton, Ohio, division to increase valve production 50 per cent. New molding, pouring and cupola-charging equipment will be installed.

American Steel Foundries . . has issued booklet describing operations of its divisions and subsidiaries.

Midwest Foundry Co. . .Coldwater, Mich., plant has released 12-page facility report containing information for designers and buyers of castings.

American Machine & Foundry Co. . . Buffalo plant won Liberty Mutual Insurance Co.'s award for record of working more than 1,000,000 manhours without lost-time accident.

J. David Johnson Co. . . Anoka, Minn., company is acting as a casting sales agent and as a castings broker. Firm brokers gray iron castings and is ex-

Pangborn's Quarter Century Club received seven new members at a recent meeting. New members are James L. Keeney, Maxwell F. Poe, Guy M. Elliott, James S. Grove, William A. Byers, Everett C. Gilmour, and Louis Hasenbuhler. Directors of the corporation are also at the head table.

clusive sales agent for Northwest Brass and Aluminum Foundry, Inc., St. Paul, Minn.

International Nickel Co. . . . has established a research fellowship at the University of Michigan. First award was to Charles M. Hammond.

Northwest Pattern Works . . Portland, Ore., organization has moved into a new building at 2544 N.W. Upshur St.

Coolidge Propellor Co., Seattle, Wash., designed and cast 6,000 lb, 9'8" five-bladed propellor of manganese bronze. A 3000 hp diesel will turn this mighty ferry boat propellor.

Israel Foundry Association . . most Israel casting firms have joined newly formed organization.

Archer-Daniels-Midland Co. . . . has moved its Chicago sales office to 4761 W. Touhy Ave., Chicago.

Metallurgical Associates, Inc. . . plans to extend operating area beyond East Coast. Metallurgical and engineering consulting service has headquarters at Rockefeller Plaza, New York.

Cross Pump & Equip. Co. . . Charleston, W. Va., firm will distribute Morris Machine Works heavy duty slurry pumps in West Virginia, Kentucky and Virginia.

Electric Steel Foundry Co. . . building to house midwest sales office of Portland, Ore., firm has been completed in Danville, Ill.

B&T Machinery Co. . . has acquired B&T Engineering and Sales Co., Detroit, manufacturer of die-casting machines. Merger does not change operation or administration.

C. O. Bartlett & Snow Co. . . Chicago office has moved to 6525 W. North Ave., Oak Park, Ill.

Electro Refractories & Abrasives Corp. . . Buffalo, N. Y., producer has increased the capacity of its crucible mix department by 25 per cent.

Kaiser Aluminum & Chemical Corp. . . has announced a $280,000,000 expansion program that will bring the company's primary aluminum capacity up to 654,000 tons annually.

Walworth Co. . . has contracted to acquire all outstanding common stock of Conoflow Corp., Philadelphia, producer of pneumatic automatic valve control equipment.

Foxboro Co. . . Foxboro, Mass., instrument maker has completed new building to double size of training and education center.

Basic Refractories Inc. . . awarded common stock certificates as Christmas presents to members of the company's Quarter Century Club. Members receive 25 shares on completing 25 years service, and one share each year thereafter.

Forklifts, Inc. . . will distribute Clark trucks in area around their headquarters at Harrisburg, Pa.

Apex Smelting Co. . . has started construction of second stage of program to double capacity of Los Angeles plant.

American Brake Shoe Co. . . announced that its Pittsburgh plant had best safety record of company's 58 plants during 1954-55 year.

When you get bigger, you can pour.

LEO HOUSER, DODGE STEEL CSTGS. CO.

Twin City . . Pictured at the joint meeting of AFS and ASM are, left to right, Norman Silvers, Continental Machine Co.; F. W. Hall, DoALL Co.; M. F. Love, Strong-Scott Mfg. Co.; H. H. Blosjo, chapter chairman; C. G. Schelly, Wilkie Foundation; and H. Eilers, Paper Calmenson & Company.

local foundry news

Install Pittsburgh—44th Chapter of AFS

■ The Pittsburgh Foundrymen's Association became the 44th industrial chapter of the American Foundrymen's Society when it was installed January 16 at the Webster Hall Hotel. Participating in the ceremony were: H. C. Stirling, Blaw-Knox Co., PFA president; E. P. Buchanan, Pittsburgh Coke & Chemical Co., PFA secretary-treasurer; Thomas Kaveny, Jr., Herman Pneumatic Machine Co., AFS regional vice-president; Harold C. Erskine, Aluminum Co. of America, AFS director; and Wm. W. Maloney, AFS general manager. Mr. Maloney made the traditional presentation of a cast iron rattle to the new chapter.

Technical program featured Robert A. Colton, Federated Metals Div., American Smelting & Refining Co., speaking on *"Better Aluminum and Bronze Castings."*

JOHN BING, METROPOLITAN REFRACTORIES CORP.

Metropolitan . . The annual Christmas party was held in the Essex House.

AFS Nears Membership Goal

Target of 12,000 members in the American Foundrymen's Society by June 30 has nearly been met in the first six months of the fiscal year July 1, 1955-June 30, 1956. From July 1 last year when membership totalled 10,965, there was an increase of 876 or 7.9 per cent up to December 31. When the 12,000 mark is reached it will be the first time in several years that membership has topped the annual goal set.

Cincinnati District

Nearly 500 members, their ladies and guests of the Cincinnati District Chapter of AFS were on hand for their 17th Annual Christmas Dinner Dance, December 17 in the Pavilion Caprice at the Netherland Plaza Hotel in Cincinnati.—*M. E. Rollman, Cincinnati Milling Machine Co.*

Central Illinois

Four hundred and seventy five members and guests attended the Central Illinois Chapter's Christmas Party held December 10 at the American Legion Hall, Peoria, Ill.—*H. L. Marlatt, Galva Foundry Co.*

Northern California . . Maurice Sandes, California State Apprenticeship Committee (left), and Harold Hirsch, American Manganese Steel Div., American Brake Shoe Co. (right), speakers at the December meeting, shown with Harold E. Henderson, H. C. Macauley Foundry Co., chapter vice-chairman and program chairman.

Northeastern Ohio

More than 200 foundrymen gathered at the Tudor Arms Hotel, Cleveland, on November 10 to hear C. E. Wenninger, National Engineering Co., Chicago, discuss *"Digging into Sand*

Ontario . . Speaking at the December meeting is G. W. Merrefield, Giffels & Vallet of Canada, whose subject was "Pressure Molding."

Fundamentals." Mr. Wenninger said that foundrymen must consider the physical relationships of sand components and discount some set thoughts on test properties.

Tests, he stated, are for control after it has been decided that a given sand will work. A four-sieve sand with rounded grains ordinarily is preferable because it will ram compactly, but what is good for some jobs might not work as well for another job or another foundry. There is no universal sand.

In synthetic sand it might be well to add more than enough clay and fines and to mull the mixture less. The sand thereby can hold more water. Such procedure is a trend to what natural sands are like. Some sands must be mulled, and some can be mixed. When clay is added to low-clay sand, mulling is required. Adding water too fast creates clay balls. A lubricant such as core oil can be added to facing sand to give flowability.

On December 8 Northeastern Ohio Chapter held its Annual Christmas Party at the Hotel Carter, Cleveland. One thousand foundrymen and guests were on hand to enjoy dinner and an evening of entertainment.—*Jack C. Miske, Foundry.*

Ontario

Royal Connaught Hotel was the scene of the December 9 meeting of the Ontario Chapter of AFS. This night was proclaimed as Past-Chairmen's Night, with 13 past chairmen in attendance.

Speaker for the evening was G. W. Merrefield, Giffels & Vallet of Canada. He related that the diaphragm

molding machine is being improved in design so that increasing rate of molds is possible. Sand control for utmost flowability is most important. Flask design, so that there is no springing of the sides during application of pressure, is a necessity. Pressure molding methods should result in a higher molding rate as well as improved quality of castings.—*Dave Magder, United Smelting & Refining Co.*

Birmingham District

Cascade Plunge was the scene of the Birmingham District Chapter's Annual Christmas Party, December 16. Approximately 140 members and guests participated in the evening's festivities.—*Paul B. Sullivan, U. S. Pipe & Foundry Co.*

Texas

The Texas Chapter of AFS has published its Roster of Members for 1955-56.

Rochester

T. F. Kiley, Meehanite Metal Corp., spoke at the December 6 meeting of the Rochester Chapter of AFS. In his speech *"Gating & Risering"* he described the advantage of a properly designed pouring basin and what it should accomplish, and the relative sizes of downsprues, runners, and ingates were given in dimensional proportions. Also discussed was how to choke the metal properly and the places to do so, and the placing of risers and the effective percentage of them.—*G. Arthur Spindler, City Pattern Works.*

Philadelphia . . Speaker at the November meeting, C. A. Thomas, National Engineering Co., (right), pictured with George Wileman, chapter technical chairman, (left), and Charles Mooney, chapter chairman.

Western Michigan

Roy J. Carver, Carver Fdy. Products Co., spoke at the November 7 meeting of the Western Michigan Chap-

ter. His topic was *"Carbon Dioxide Process for Hardening Cores and Molds."* He pointed out that a washed, clay free sand was necessary to the making of good clean hard cores.

It was also made clear that the CO_2 Process can be used in high production foundries as well as in the job shop. Storage of the cores is no problem as the cores go directly from the core room to the molder thus eliminating unnecessary handling and reduced breakage.—*Joe Cannon, Muskegon Aluminum Foundry Co.*

Canton District

The December 1 meeting of the Canton District Chapter of AFS was held at the American Legion Hall, Massillon, Ohio. C. A. Sanders, American Colloid Co., spoke on *"Synthetic vs Natural Bonded Sand"* stressing that good castings can be made by using conventional foundry methods if they are properly supervised and controlled. He also said that it is important to double check conventional methods before plunging into one of the new processes.

Dale Crumley, Rockwell Manufacturing Co., has been elected treasurer of the chapter, replacing Anton Dorfmueller, Archer-Daniels-Midland Co., who was transferred to Buffalo. —*R. R. Kozinski, Canton Malleable Iron Co.*

Birmingham District

On November 4 the Birmingham District Chapter held its meeting at the country club in Anniston, Ala. The program consisted of a panel discussion on soil pipe production. J. Wylie Perry, Alabama Pipe Co., outlined the history of the soil pipe industry. This was followed by a discussion of the Central Foundry split mold including a film of the Central Foundry operation presented by T. H. Burns, Central Foundry.

Leo LeBlanc, Alabama Pipe Co., described the centrifugal sand mold process; E. E. Pollard, Tyler Pipe & Foundry Co., spoke on the method used at his plant; and D. B. Shannon, Sommerville Iron Works, described the rubber diaphragm method used by his company. In addition, O. J. Bach, vice-president, Akers Styckebruk Iron Works, Sweden, described the method used in his country and also presented a film.—*A. B. Schwarzkopf, U. S. Pipe & Foundry Co.*

Metropolitan

On November 30 and December 1, the Educational Committee of the Metropolitan Chapter of AFS sponsored a course on welding techniques. The course consisted of panel discussions and questions from the floor, and many phases of welding practices were discussed. Meetings were held in the auditorium of the Research Laboratories of American Smelting & Refining Co., South Plainfield, N. J., and were well attended.

The first night's discussion dealt mainly with ferrous castings, while on the second night, the welding of non-ferrous castings was explored. Much interest was centered around the latest techniques developed in welding cast iron with pre-heat temperatures, uniform cooling rates, and best pre-heat temperatures thoroughly discussed. It was felt that generally a lower uniform pre-heat gave better results than a high local temperature.

James F. Vanick, International Nickel Co., acted as chairman, with Arthur N. Kugler, Air Reduction Sales Co., as moderator. The panel was composed of Frank Pilia, Linde Air Products Co.; Jack Cahill, New York Naval Shipyard; Harold Waugh, International Nickel Co.; and John Mickulak, Worthington Corp.

Lehigh Valley

Stewart A. Wick and Daniel J. Jones, both of New Jersey Silica Sand Co., spoke on *"Geology of Southern New Jersey"* and *"Mining and Processing Sands for Foundry Use"* respectively, at the December 13 meeting of the Lehigh Valley Foundrymen's Assn.

Mr. Wick showed samples of the sand deposits in South Jersey that accumulated during the various geological periods along with colored slides.

Mr. Jones used colored slides to show equipment and methods for mining, processing, testing, storing, and shipping the various grades of sand.—*R. B. Fischer, Ingersoll-Rand Co.*

Twin City

The November 29 meeting of the Twin City Chapter of AFS was held at the Covered Wagon Restaurant in Minneapolis.

M. J. Allen, American Steel Castings, Inc., spoke on *"The Foundry and the Community."* In his talk, he presented some interesting statistics illustrating the importance of the foundry to both the national economy and the American public. He concluded with several suggested approaches to improve public relations for any shop

CIRCLE NO. 132, PAGE 63-64

regardless of size. Particular emphasis was placed on supporting and promoting community functions and charity efforts.

Fred Neal, Smith-Sharpe Co., Minneapolis, chairman of the Membership Committee, was singled out for special praise by the chapter chairman, H. H. Blosjo, in recognition of his successful membership campaigning. Mr. Neal's campaign has netted twelve new members—only three short of the Chapter's goal for June 30.

The Twin City Chapter's Annual Christmas Party was held December 10 at the Nicollet Hotel in Minneapolis. M. Liptak, Jr. was chairman of the Christmas Party Committee.—*R. J. Mulligan, Archer-Daniels-Midland Co.*

University of Illinois

The December 7 meeting of the University of Illinois Student Chapter was held in the Mechanical Engineering Bldg. on the Urbana campus. This was a combined meeting of AFS, ASME, and SAE.

C. B. Leach, Pontiac Motor Car Div., General Motors Corp., spoke on "*Automobile Engineering—What I Must Know.*" He briefly discussed an automobile from conception to completion and then spent considerable time on major units and spoke on the engine, molding, core making, core setting, metallurgical, etc.—*James L. Leach, University of Illinois.*

Northwestern Pennsylvania

In an effort to create more interest and reach more members, the Northwestern Pennsylvania Chapter of AFS has established a standing committee to arrange at least three meetings a year, every year, in Meadville, Grove City, Oil City, Franklin, or Greenville, Pa. These groups will be sections of the parent chapter.

Walter Clemons, Meadville Malleable Iron Co., is chairman of the committee whose members consist of Harry Ahl, Roger Carver, John Pearson, Wesley Hodge, and William Eccles.

Philadelphia

The Philadelphia Chapter of AFS held its November meeting at the Engineers' Club, Philadelphia.

C. A. Thomas, National Engineering Co., Chicago, spoke on "*Progress in Foundry Automation.*" Technical chairman was George N. Wileman, foundry consulting engineer.

The Wm. B. Coleman Scholarship Award was presented to Kenneth E.

Reisch, engineering student, Pennsylvania State College.

Over 600 foundrymen, manufacturers, and their guests attended the chapter's Annual Christmas Party in December.

The Philadelphia Chapter now has its own "Chapter News Letter." George H. Bradshaw led this project which has been greatly needed and wanted for some years. The first issue appeared October 15.—*Charles R. Sweeny, Atlantic Steel Castings Co.*

Penn State Student Chapter

The feature of the November 17 meeting of the Penn State Chapter was a talk on *"The Melting and Refining of Brass"* by Charles V. Knobeloch, R. Lavin & Sons, Chicago.

Chicago

At the December 5 meeting of the Chicago Chapter held at the Chicago Bar Association, Robert Wright of Pattern Milling Service, Cleveland, spoke through the courtesy of Oliver Machinery Co., Grand Rapids, Mich., to the pattern group on *"Advantages of a Wood Milling Machine In Your Pattern Shop."* Illustrating its use as a lathe, shaper, and sander, as well as a mill, Wright said the machine is adaptable to any operation that isn't a carpenter job. On modern work, Wright has held tolerances to ±0.005 in., on 18-in. dimensions.

Speaking on *"Where to Look for New Business"* Eric Welander, John Deere Malleable Works, East Moline, Ill., told the malleable and steel group to produce a tremendously improved product at a lower cost before attempting new business. Know castings better, know competing processes better, then go after conversions, advised Welander.

T. A. Lyon, Dubois Engineering Co., stated, in his talk, *"Foundry Heating & Ventilating,"* to the maintenance and non-ferrous division that governmental regulation has forced foundries to ventilate and to control environment in their shops; actions that wise businessmen would have taken earlier as a means of increasing profits. Proper heating and ventilating of a foundry are two of the best ways

to improve human relations and quality of product.

After six years of research, International Harvester engineer, David Matter reported in his talk, *"Characteristics & Applications of Ductile Iron"* to the Gray Iron Div. that nodular iron, used in conjunction with new melting methods, makes it possible to cast parts once fabricated by other methods. Matter cited examples of nodular iron parts replacing parts of other fabrication or materials. Technical chairman for the session, J. G. Haines, Woodruff and Edwards Co., stated that he thought this would be the banner year for nodular iron.

The January 3 meeting of the Chicago Chapter was a combination Management and Chapter Past-Presidents' Night held at the Chicago Bar Assn. James H. Smith spoke on how his Central Foundry Div., General Motors Corp., plans to meet the challenge of producing increasingly high-quality, low-cost castings.

Plans include 108-in. and larger cupolas operating with 1000 F hot blast and humidity controls for periods of a week without repair and in conjunction with electric furnaces for the production of thinner wall castings.

Smith predicted their 1956 shell molded casting tonnage will triple that of 1955 and will include 70-lb V-8 crankshafts and make use of the blow-hot press shell molding machine. At present a laboratory operation, Smith foresaw the commercial use of as-cast malleable. The new GM movie *"To Meet The Challenge"* revealed steps already taken to improve operations.

On hand were past presidents: James Thomson, L. J. Wise, H. W. Johnson, L. H. Rudesill, C. E. Westover, G. P. Phillips, L. L. Henkel, A. G. Gierach, J. C. Gore, L. H. Hahn, C. K. Faunt, W. D. McMillan, C. V. Nass, W. W. Moore, J. H. Owen, J. A. Rassenfoss, and R. L. Doelman.

The Chicago Chapter will present in a series of three meetings, product improvement. The first meeting will be held at the Chicago Bar Assn., March 5, when Nathan Levinsohn, Minneapolis-Moline Co., Minneapolis, will speak on *"Producing Quality Castings."* The second and third meetings will be March 12 and 19 in the Peoples Gas Light & Coke Auditorium. The series of three meetings will cost $1.00, and certificates will be awarded for attendance at series.

Is a Foundry a Poor Place to Work?

■ The foundry is not always considered the most pleasant place to work. The two most important reasons for this idea are that it is partly true and there is general ignorance of the true facts and remedies.

The facts and the remedies are now spelled out in a new book, ENGINEERING FOR CONTROL OF IN-PLANT ENVIRONMENT IN FOUNDRIES, just released by the American Foundrymen's Society.

Prepared by the AFS Dust Control and Ventilation Committee as a part of the Safety, Hygiene and Air Pollution Control program, the book contains both the general background information and specific design data for making the foundry a better place to work.

The materials and processes in foundry practice that influence health, safety and comfort are discussed and their characteristics are identified. Ventilating systems are described generally and then specifically with data furnished for the design of exhaust hoods and exhaust systems.

The particular problems in each foundry operation are discussed and remedies are given in chapters that include sand handling, molding and core making, melting and pouring, radiation, cleaning room, welding, woodworking and dust and fume collectors.

Maintenance and testing required to keep the ventilation and dust collecting system in effective operation is described and recommendations for inspection schedules and procedures are given.

Good housekeeping is discussed as a basic element in the dust control program and as a factor in reducing occupational disease and accidents.

Members of the committee that prepared the new manual are: John G. Liskow, American Air Filter Co. Inc., Louisville, Ky., *chairman;* A. G. Granath, National Engineering Co., Chicago, *vice-chairman;* C. F. Fluegge, International Harvester Co., Chicago; T. J. Glaza, Crane Co., Chicago; W. G. Hazard, Owens-Illinois Glass Co., Toledo, Ohio; L. J. Jacobs, S. Obermayer Co., Chicago; A. S. Lundy, Claude B. Schneible Co., Detroit; Kenneth Robinson, General Motors Corp., Detroit; Herbert T. Walworth, Lumbermens' Mutual Casualty Co., Chicago; Edward G. Meiter, Employers Mutual Liability Ins. Co., Milwaukee; Carter DeLaittre, Minneapolis Electric Steel Castings Co., Minneapolis; William R. Retzer, Caterpillar Tractor Co., East Peoria, Ill.; William Tracy, B. F. Sturtevant Div., Chicago.

ENGINEERING MANUAL FOR CONTROL OF IN-PLANT ENVIRONMENT IN FOUNDRIES is an 8½ x 11-in. casebound volume containing 152 pages and over 200 illustrations, tables, and charts. Price is $6.00 to AFS members and $7.75 to non-members.

Postage will be prepaid if remittance accompanies order. Write: Book Department, American Foundrymen's Society, Golf & Wolf Roads, Desplaines, Ill.

Faherty Heads CISPI

Hamilton (left) to Faherty

■ Newly elected president of the Cast Iron Soil Pipe Institute, Philip J. Faherty (right) Buffalo Pipe & Foundry Corp., Buffalo, N. Y., receives gavel from predecessor Frank T. Hamilton, Rudisill Foundry Co., Anniston, Ala.

New vice president is Joe H. King, III, T. C. King Pipe & Foundry Co., Anniston. Deems W. Hallman, Hajoca Corp., Quakertown, Pa., is treasurer. Homer E. Robertson, Washington D. C., was renamed Institute executive vice president.

Directors with two-year terms are Charles A. Hamilton, Alabama Pipe Co., Anniston; A. S. W. Love, American Brass & Iron Foundry, Oakland, Calif.; and Carl McFarlin, Jr., Sommerville Iron Works, Inc., Nashville, Tenn.

Conveyor Group Confident

Distribution is a relatively undeveloped field waiting for mechanization, according to the Conveyor Equipment Manufacturers Association. The conveyor industry foresees vast opportunities for the expansion of mechanized handling in 1956.

Conveyor production has become a $300,000,000 a year industry and the existing backlog of orders indicates that 1956 will continue at the brisk pace at which 1955 ended, according to the conveyor group.

afs chapter meetings

FEBRUARY

1 . . Toledo . . Toledo Yacht Club, Toledo, Ohio.

2 . . Saginaw Valley . . Fischer's Hotel. Frankenmuth, Mich. Annual Ladies Night.

2 . . Canton District . . Elks Club, Barberton, Ohio. W. A. Hambley, Chas. A. Krause Milling Co., *"Scrap—Whose?"*

6 . . Metropolitan . . Essex House, Newark, N. J. Round Table Meeting on Gating of Castings. Steel—K. V. Wheeler, Alloy Steel Products Corp.; Cast Iron—R. Fischer, Ingersoll-Rand Co.; Non-Ferrous—D. L. LaVelle, Federated Metals Div.

6 . . Central Illinois . . Legion Hall, Peoria. *"Know Your Area Foundry."* A representative from each foundry in Central Illinois area is invited to give a description of his foundry and its products.

6 . . Central Indiana . . Athenaeum Turners, Indianapolis. B. H. Taylor, B. F. Goodrich Co., *"Todays Challenge in Human Relations."*

7 . . Chicago . . Chicago Bar Association. Round Table Meeting. Malleable & Non-Ferrous Div.—AFS movie on *"Study of Fluid Flow Through Vertical Gating System"*; Gray Iron & Maintenance Div.—E. J. Jory, Lester B. Knight & Assoc., Inc., *"Progressive Mechanization on a Small Budget"*; Pattern Div.—David Kindt, Kindt Collins Co., *"Research in Pattern Coatings"*; Steel Div.—W. G. Rinehart, Harnischfeger Corp., *"Welding Rods and Machines."*

7 . . Rochester . . Chamber of Commerce, Rochester, N. Y. Joint meeting with the American Society for Metals.

9 . . Northeastern Ohio . . Tudor Arms Hotel, Cleveland. Richard L. Olson, Dike-O-Seal, Inc., Chicago, *"A New Development in Core Box Construction for Blowing."*

9 . . St. Louis . . York Hotel, St. Louis. H. F. Bishop, Naval Research Lab., Washington, D. C., *"Feeding Castings."*

9-10 . . Wisconsin . . Schroeder Hotel, Milwaukee. Wisconsin Regional Foundry Conference sponsored by the AFS Wisconsin Chapter, the University of Wisconsin, and the AFS Wisconsin Student Chapter.

10 . . Eastern Canada . . Mount Royal Hotel, Montreal. Invite the Boss Night. Harry E. Gravlin, Claude B. Schneible Co., *"Who Will Believe in it First?"*

10 . . Philadelphia . . Engineers' Club, Philadelphia. William G. Gude, managing editor, *Foundry*, *"Castings Market."*

10 . . Central New York . . Onondaga Hotel, Syracuse. Eastman Kodak Co. representative, *"Non-Destructive Testing."*

11 . . Chicago . . Knickerbocker Hotel, Chicago. Annual Ladies Night.

13 . . Michiana . . Club Normandy, Mishawaka, Ind. J. H. Smith, Central Foundries Div., General Motors Corp., *"Future of the Foundry Industry."*

13 . . Cincinnati District . . Anthony Wayne Hotel, Hamilton, Ohio. E. H. King, Hill & Griffith Co., *"Molding Sands and Molding Methods as Related to Casting Dimensions."*

14 . . Rochester . . Chamber of Commerce, Rochester, N. Y. Dr. Robert A. Charpie, Oak Ridge National Lab., Oak Ridge, Tennessee.

14 . . Twin City . . Covered Wagon, Minneapolis. Panel discussion: *"Abrasive Grinding of Castings."* Moderator will be John Uppgren, Northern Ordnance Co.

15 . . Mo-Kan . . Fairfax Airport, Kansas City. Chester V. Nass, Beardsley & Piper, *"Mechanization in a Small Foundry."*

16-17 . . Birmingham District . . Tutwiler Hotel, Birmingham, Ala. Southeastern Regional Foundry Conference sponsored by the ALF Birmingham District and Tennessee Chapters and the University of Alabama Student Chapter.

24 . . Chesapeake . . Engineers' Club, Baltimore, Md. Mel Young, U. S. Gypsum Co., *"New Materials & Techniques for Pattern Making."*

24 . . Ontario . . Royal Connaught Hotel, Hamilton, Ontario. Panel discussions on *"Centrifugal Casting of Bronze"* and *"Modern Cupola Practice."*

24 . . Tennessee . . Patten Hotel, Chattanooga, Tenn. Harry H. Kessler, Sorbo-Mat Process Engineers, *"Gating and Risering."*

MARCH

1 . . Canton District . . Elks Club, Alliance, Ohio. John A. Rassenfoss, American Steel Foundries, *"Hot Tears In Steel Castings."*

5 . . Central Indiana . . Athenaeum Turners, Indianapolis. Hans J. Heine, technical director, American Foundrymen's Society, *"Improved Foundry Technique."*

5 . . Chicago . . Chicago Bar Association. First of educational series on product improvement. N. Levinsohn, Minneapolis-Moline, *"Producing Quality Castings."*

classified advertising

For Sale
Help Wanted,
Personals,
Engineering Service, etc.,

set solid . . 20c per word, 30 words ($6.00) minimum, prepaid.

Positions Wanted

. . 10c per word, 30 words ($3.00) minimum, prepaid. Box number, care of **Modern Castings,** counts as 10 additional words.

HELP WANTED

CLEANING ROOM FOREMAN. Well established steel jobbing foundry in Southwest specializing in medium and light weight carbon and alloy pressure castings needs: cleaning room foreman thoroughly experienced in heat treating, welding, cleaning, grinding, and inspection. Exceptional opportunities for ambitious man of real ability. Send photograph, complete biography, and salary expectations. All replies confidential. **Box C109 MODERN CASTINGS, Golf & Wolf Roads, Des Plaines, Ill.**

MOLDING FOREMAN for Eastern Non-Ferrous Jobbing Foundry specializing in Bronze Alloys and Aluminum. Either salary or substantial hourly rate. One who can take a job and see it through to completion with minimum effort. Write giving personal history, references and salary or rate desired. Our own men know of this advertisement. **Box C95 MODERN CASTINGS, Golf and Wolf Roads, Des Plaines, Ill.**

FOUNDRY ASSISTANT needed by captive gray iron foundry or medium size heavy process machinery manufacturer. Young college engineer graduate preferred. Should have had some foundry experience. Is to help increase plant efficiency, planning, research and operation. Company has liberal profit sharing plan. Salary open. Location S. E. Penna. Reply **Box C65, MODERN CASTINGS, Golf and Wolf Roads, Des Plaines, Ill.**

We want several live-wire salesmen who are now working on salary and who think that they could increase their earnings by selling on liberal commission. These men must have followings in industries buying master alloys and hardeners. Please give full details in your first letter, i.e., personal history, employment record, territory, etc. Your information will be held in strictest confidence. **Box C70, MODERN CASTINGS, Golf and Wolf Roads, Des Plaines, Ill.**

FOUNDRY SALES ENGINEER INDIANA TERRITORY Midwest refractories manufacturer has excellent opportunity for a man 25 to 35 years old, experienced in cupola refractories and molding sands. The man selected will be properly trained so he can really enjoy his work. Salary and expenses. **Box C102 Modern Castings, Golf and Wolf Roads, Des Plaines, Ill.**

ENGINEER INDUSTRIAL. Experience in heavy gray iron. Large Conn. foundry. Capable of establishing new basic time standards. Also analyze foundry operations for cost reduction. Indicate experience and salary requirements. **Box C85 MODERN CASTINGS, Golf and Wolf Roads, Des Plaines, Ill.**

SALES ENGINEER Well established southeast Foundry offers excellent opportunity to aggressive Sales Engineer in foundry and structural steel. Send full qualifications in first letter. Box C103 MODERN CASTINGS, Golf and Wolf Roads, Des Plaines, Ill. "C"

NON-FERROUS FOUNDRY . . North Texas industrial center. Jobbing . . squeezers, rollover, Newaygo sandhandling. Established customers, recently expanded. Need capital . . . consider managing partner. Sales cover all southwest. Box C104 MODERN CASTINGS, Golf and Wolf Roads, Des Plaines, Ill.

SALES ENGINEER for Western bentonite company expanded into foundry field. Experience required and salary will depend upon qualifications. Give full details on background. Replies will be confidential. Box C105 MODERN CASTINGS, Golf and Wolf Roads, Des Plaines, Ill.

ENGINEERING EDITOR National technical magazine, permanent, immediate, Chicago suburb. Original plant writeups, rewrite, editing. Some travel. Familiarity with metal castings and engineering essential. Foundry engineering experience desirable. Ability to write rapidly, clearly, accurately required. State experience, education, age, salary requirements. Enclose samples of writing. Box C107 MODERN CASTINGS, Golf and Wolf Roads, Des Plaines, Ill.

POSITIONS WANTED

ALLOY STEEL FOUNDRY SUPERINTENDENT Seeking challenging, responsible operations position with progressive steel foundry. Age 37, metallurgical and engineering background. Top qualifications electric melting, gating and heading, sands and refractories, labor relations, plant administration. Pioneer in shell molding, successful foundry research and technical development history. In charge of foundry operations for one of largest alloy steel shops in East. Box C106 MODERN CASTINGS, Golf and Wolf Roads, Des Plaines, Ill.

YOUNG EXECUTIVE ferrous foundryman with technical education and broad experience in steels, gray irons, and malleables wants sales position with progressive foundry or challenging management job with potential. Now managing medium sized gray iron foundry. Box C108 MODERN CASTINGS, Golf and Wolf Roads, Des Plaines, Ill.

ENGINEERING SERVICE

EARL E. WOODLIFF,
Foundry Sand Engineer.
Consulting . . . Testing.
14611 Fenkell (5-Mile Rd.)
Detroit 27, Mich.
Res. Phone Vermont 5-8724

SESSIONS ENGINEERING CO.

Consulting Foundry Engineers
Modernization, Processing Layouts
Cost Reduction Quality Control
Product—Machine Design
Architectural Design

One North La Salle St., Chicago 2, Ill.

FOR SALE

FURNACES FOR SALE

10 used Heat Treating Furnaces, and two 7-ton gantry cranes, good condition, priced to sell.

BAER STEEL PRODUCTS, INC.
Box 1428
Boise, Idaho

EQUIPMENT WANTED

WANTED TO BUY
½ OR ½ TON ACID
ELECTRIC FURNACE
Box C101 MODERN CASTINGS
Golf and Wolf Roads,
Des Plaines, Ill.

advertisers and their agencies

The Adams Company 54
Agency—W. D. Lyon Co., Inc.
Ajax Electrothermic Corp. 17
Agency—Harry P. Bridge Co.
American Colloid Co. 10
Robert A. Gallagher Adv.
American Foundrymen's Society
Engineering Manual 79
Power to Reach the Goal 71
Apex Smelting Company .....Back Cover
Agency—Doremus & Co.
Archer-Daniels-Midland Co. .....8 & 9
Agency—Bayless-Kerr Co.
Beardsley & Piper
Div. Pettibone Mulliken Corp. ....13 & 14
Agency—Ladd, Southward, Gordon & Donald, Inc.

continued on page 82

continued from page 81

British Moulding Machine Co., Ltd. 77
Agency—Rooster Publicity Ltd.
Carl Mayer Corp. 16
Agency—Brad Wright Smith Advertising, Inc.
Christiansen Corp. 52
Agency—Marsteller, Rickard, Gebhardt and Reed, Inc.
City Pattern Foundry & Machine Co. 61
Agency—Gray & Kilgore, Inc.
Cleveland Flux Co. 2
Agency—Brad Wright Smith Adv., Inc.
C. R. Daniels, Inc. 19
Agency—Foster and Green, Inc.
Delta Oil Products Co. 18
Agency—Cormack, Imse, Beaumont, Inc.
Harry W. Dietert Co. 15
Agency—Hall, Scott & Associates
Eastern Clay Products Dept., International Minerals & Chemical Corp. 53
Agency—C. Franklin Brown, Inc.
Electro Metallurgical Co. 67
Agency—J. M. Mathes, Inc. Adv.
Erie Strayer Co. 57
Agency—Mitchell Adv. Agency
The Federal Foundry Supply Co. 1
Agency—Kasper Advertising
General Electric Co.
Phenolics-Foundry Resins Chemical Div. .. 7
Agency—Benton & Bowles, Inc.
Gray Iron Founders' Society, Inc. 74
Agency—Fuller & Smith & Ross, Inc.
Samuel Greenfield Co. 73
Agency—Gotthelf & Weil
Hickman, Williams & Co., Inc. 6
Agency—Saas and Sogard, Inc.
International Minerals & Chemical Corp. .. 53
Agency—C. Franklin Brown, Inc.
Jeffrey Mfg. Co. 66
Agency—The Griswold-Eshleman Co.
Chas. C. Kawin Co. 52
Keokuk Electro-Metals Co. 70
Agency—Waldie & Briggs, Inc.
Link-Belt Co. 55
Agency—Klau-Van Pietersom-Dunlap Assoc.
Lithium Corporation of America, Inc. 12
Agency—Keystone Advertising, Inc.
Magnaflux Corporation 34
Agency—Glenn, Jordan, Stoetzel, Inc.
L. H. Marshall Co. 68
Agency—Stacy O. Taylor, Adv.
MODERN CASTINGS 23
MODERN CASTINGS 58
MODERN CASTINGS 59
Molybdenum Corp. of America 82
Agency—Smith, Taylor & Jenkins, Inc.
National Engineering Co. 5
Agency—Russell T. Gray, Inc.
National Metal Abrasive Co. 6
Agency—Saas and Sogard, Inc.
Newaygo Engineering Co. 76
Agency—The Jaqua Co.
Oliver Machinery Co. 81
Agency—Webb J. Van Dyke Adv.
Orefraction Inc. 56
Agency—Smith, Taylor & Jenkins, Inc.
Pangborn Corp., Malleabrasive Div. 62
Agency—Van Sant, Dugdale & Co., Inc.
Pettibone Mulliken Corp. .....13 & 14
Agency—Ladd, Southward, Gordon & Donald, Inc.
Philadelphia Quartz Company 78
Agency—The Michener Company
Pittsburgh Lectromelt Furnace Corp. .....Inside Front Cover
Agency—The Griswold-Eshleman Co.
Reichhold Chemicals, Inc. 60
Agency—MacManus, John & Adams, Inc.
George Sall Metals Co. 65
Agency—Advertising Associates of Philadelphia
Semet-Solvay Div. Allied Chemical & Dye Corp. 81
Shell Process, Inc. 72
Agency—Charles E. Vautrain Associates, Inc.
G. E. Smith, Inc. 75
Agency—Smith, Taylor & Jenkins, Inc.
Frederic B. Stevens, Inc. ....Inside Back Cover
Agency—Zarker Adv. Co.
Syntron Co. 78
Agency—Servad, Inc.
Union Carbide & Carbon Corp. 67
Agency—J. M. Mathes, Inc. Adv.
United Oil Mfg. Co. 11
Agency—Davies and McKinney Adv.
Vanadium Corp. of America 69
Agency—Hazard Advertising Company
Weldron Silica Co. 81
Agency—Armstrong Adv. Agency

obituaries

James McElgin, 54, manager of the metalworking department of E. F. Houghton & Co., Philadelphia, died suddenly while on business in Chicago on December 7.

Mr. McElgin was a member of the American Foundrymen's Society, American Society for Metals, and American Ordnance Association.

Walter E. Oelschlaeger, 67, manager of the By-Product Div., Republic Coal & Coke Co., Chicago, passed away November 28.

Clifton W. Sherman, founder and chairman of the board of directors, Dominion Foundry & Steel, Ltd., Hamilton, Ont., passed away November 24. He founded Dominion Foundries in 1912 and was president until 1945, when he became chairman of the board.

E. L. Graham, 78, founder and former president, Acme Foundry & Machine Co., Coffeyville, Kans., died November 29. He organized the company in 1914 and served as its president and general manager until 1947.

William F. Steffen, 63, a foundry foreman for Wisconsin Grey Iron Foundry Co., Milwaukee, for the past 15 years, passed away November 19.

SFSA Releases Directory

Steel Founders' Society of America has announced that the 1955-56 directory of steel foundries is now available. SFSA states that the book is the only comprehensive directory of steel foundries published in the United States.

Every known steel foundry in the United States, Canada and Mexico is listed with basic information on the type, size and kind of steel castings produced. Melting, heat treating and special processes used in the plants are listed, along with the rated capacity, number of employees and identity of key personnel.

The book may be ordered from SFSA, 606 Terminal Tower, Cleveland 13. Price, $10.00.